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Automobile Foundry Core-Room Economies

Rearrangement of a Plant to Facilitate
the Movement of Materials and Product
—Saving Time and Labor in Pasting Cores

The Detroit Foundry Company, Detroit, Mich., operates a large jobbing foundry in which the work is almost wholly for automobile manufacturers. The problem presented is to produce the greatest output in a minimum space and with a minimum amount of handling. The development of the work,

like those shown in the middle of the illustration were used. The sand, dryers, core plates, core boxes and other supplies are delivered to the workmen from an alley back of the benches, the sand being shoveled into the hopper shown and the other supplies delivered to the shelves above the bench.



Fig. 1—For Cores Which Can Stand Some Handling, Benches Like Those in the Middle Are Used. Sand and Supplies Are Delivered from the Alley Back of Them. Core Cars at Right and Machine Benches at Left

the changed conditions of the market, and the change in the design of machines have necessitated many changes in the foundry practice. To meet these it was necessary to increase the output of the core ovens as well as the output of the core room. At the same time it was desired to use the existing equipment as far as practicable.

Fig. 1 shows a view in one part of the core room which illustrates several features of the development. For medium-sized cores which were fairly bulky and could stand some handling, benches

The individual existing benches were refitted to meet these requirements. Individual rather than multiple benches were used as eliminating the difficulty arising from one workman's jarring the bench on which another workman is trying to draw a core box or conduct some similar delicate operation.

The core makers place their cores directly on the core cars shown at the right. In the background may be seen cores placed on racks, where they are given an inspection while still in the green state



Fig. 2—Cores from Ovens Are Placed Directly in Storage Racks, from Which They Are Taken to Benches for Inspection, Pasting and Cleaning

and then placed on the core cars by the inspectors.

At the left of the delivery alley shown in the center of the picture there is a series of machine benches. These are arranged with pockets or bins into which the sand can be shoveled from the back, and with shelves to receive the wires, dryers and other supplies required by the core makers. The machines are of the roll-over type and are located along the face of the benches so that the man always has his core sand and bedding sand ready at hand in the bins. The cores made on the roll-over machines are placed on the racks opposite the machines

and are taken from the racks by inspectors who pass them on to the core ovens. The more delicate cores, most of which are made on the roll-over machines, are dried in drawer-type ovens.

The ovens are arranged to work under forced draft. The original equipment consisted of a battery of four Byram car ovens and four Byram drawer ovens. Three additional car ovens were constructed under the design of the H. M. Lane Company, Detroit, and these were also made by the Byram Company. The battery of seven car ovens are fired from one fire box and the four drawer

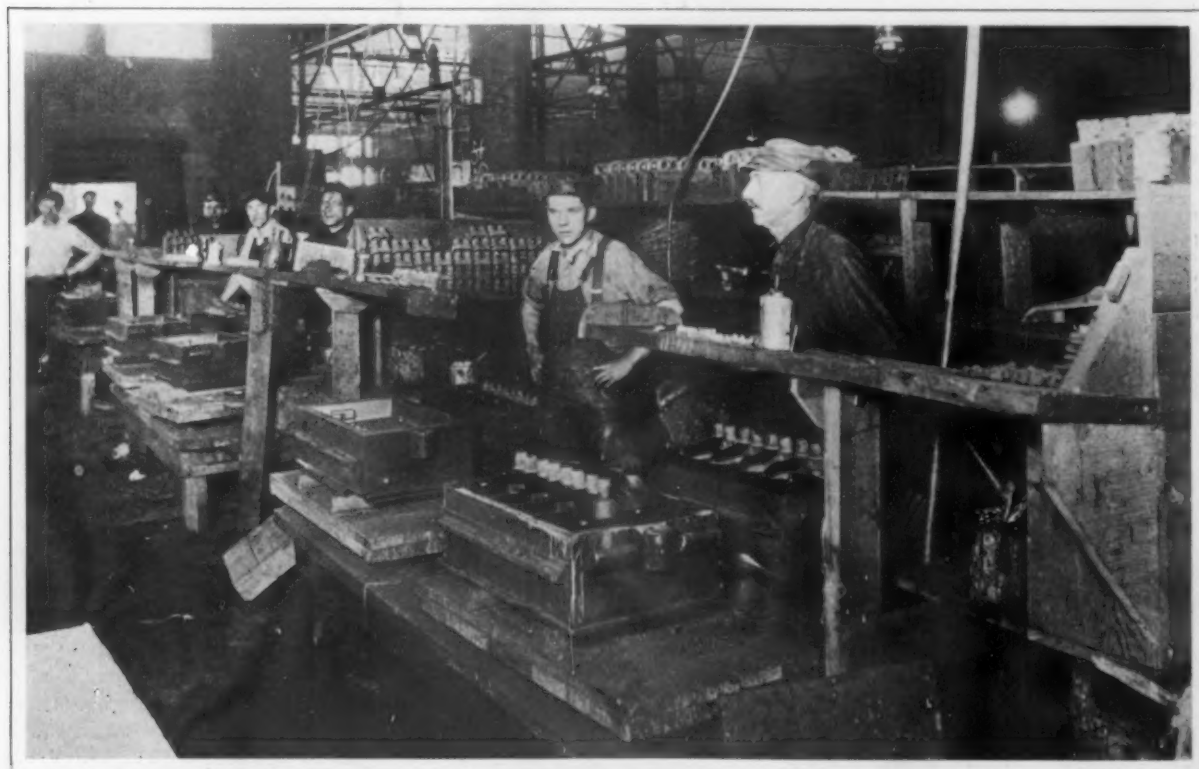


Fig. 3—Turn-table Bench for Pasting Cores in Dry Sand Molds

ovens from another. The ovens are also provided with exhaust fans to insure a positive draft under all weather conditions.

The cores from the ovens pass through a sorting and inspection department where the different classes of work are separated and prepared for the molders. Fig. 2 shows the series of inspection and pasting benches. At the time this illustration was taken active production was not going on, but the method of operation is as follows: The core cars are brought in on the left beyond the range of the picture and the cores are taken from the cars to the rough storage racks. From these they are passed through the racks behind the work bench so that each man always has a supply of cores immediately behind him. On the work bench the cores are cleaned, the vents opened, any blacking done, and also any pasting required. The core is then set up on the back of the bench and is later removed by men who pass through the alley behind the benches with small push carts which carry the cores either to the final storage or to the ovens for drying pasted or blackened cores. The aim is to keep two days' supply of cores ahead of the foundry to insure maximum production. The smaller cores are all handled in wooden tote boxes and the larger ones on trucks.

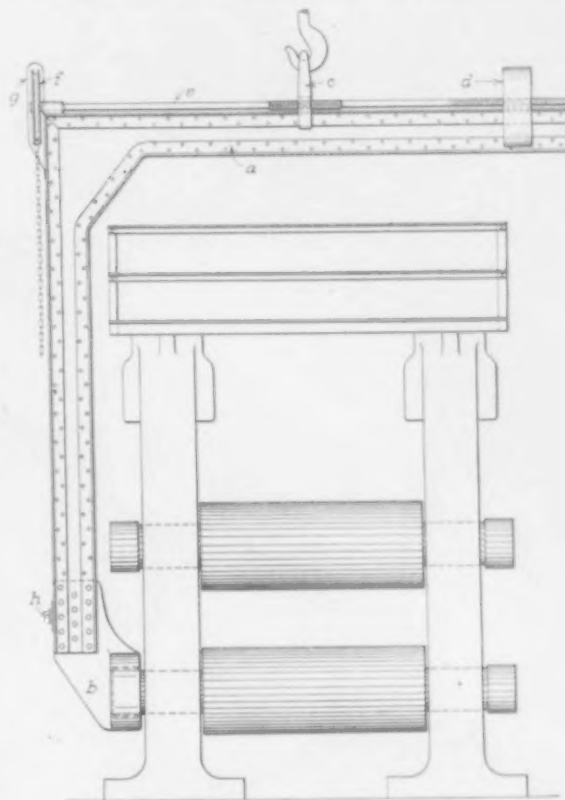
In this foundry most of the work is done in dry sand molds and the cores are assembled and pasted in the mold. Fig. 3 shows a turn-table bench for pasting cores in the molds. On each of the benches shown in the foreground there are two square turn tables. The laborer places a mold at the front of the turn table. The workman stands behind the table and swings the turn table around to bring the mold in front of him. Two men stand in a small space surrounded by racks which are supplied with cores from the back. The mold is cleaned, the cores fitted and then pasted in place. After this the workman spins the table around, moving the finished mold to the front and bringing another empty one in front of him. In Fig. 3 the workman nearest the camera had two completed molds on his table while the man at his right had one mold completed and was about to turn it around to bring an empty one before him. After the cores are pasted in the molds the mold is taken to the oven to dry the paste.

Device for Changing Rolling-Mill Rolls

Letters patent (U. S. No. 1,115,106) have recently been issued to W. H. Ramage, Youngstown, Ohio, on a device for changing rolls in rolling mills. It is designed to remove one roll and put a new one in its place in 10 to 30 min., and thus reduce mill delays due to changing rolls. Such an appliance is calculated to effect economies in operating costs as well as relieve the mill superintendent from one of his principal annoyances.

As shown in the accompanying drawing, which illustrates the mechanism at the beginning of operations about to remove a roll from the housings, the device consists of an inverted L-shaped carrier, *a*, of I-beam or box girder section or a steel casting. The lower end *b* of the vertical leg is a casting made to fit the wobbler of the rolls, and a slight taper is provided in the inner surface to enable it to be engaged to the roll, or removed therefrom, quickly and easily. The hook of an overhead traveling crane engages the rider *c*, which is free to move along the upper or horizontal leg of the carrier, as is also the counterweight *d* which is calculated to balance the vertical leg of the carrier. Both *c* and *d* are moved forward or backward along this horizontal leg by

the screw *e*, operated by the rope or chain wheel *f*, which is protected from injury by a steel plate guard, *g*. The pitch of the screw *e* is different at points *c* and *d*, being proportioned to keep the coun-



The Ramage Device for Quickly Changing Rolls

terweight *d* in such a position that it will always balance the vertical leg of the carrier when the rider *c* is moved forward or backward.

Suppose a roll suddenly breaks in the mill. While the millwright is loosening the boxes in the housings, the cranemen pick up the roll changer. If the crane hook is not directly over the center of gravity, a helper on the mill floor, by a few short pulls on the chain, puts the rider, and thus the crane hook, over the center of gravity of the device, as follows: As *c* moves, *d* also moves, but a different distance, owing to the difference in the pitch of the screw. The entire device is now moved up by the crane and attached to the wobbler of the roll. A bar inserted through the stirrups *h* will enable this to be done with ease. The apparatus is proportioned so that the point of suspension then comes over the center of gravity of the roll and any slight variation due to wear may be corrected by adjusting the chain wheel *f*. This means that the roll remains horizontal when lifted from its bearings and carried about by the roll changer. Friction due to the weight of the roll prevents the carrier's slipping off before desired. Then the crane runner, by moving his crane in the direction of the long axis of the roll, carries the roll through the housings, and can proceed with it to any desired point.

The next step is to put in the new roll. The casting *b* grips the wobbler of the new roll, the entire arrangement is balanced by adjustment of *f*, and the crane shoves the roll endwise through the housing and drops it into the roll-boxes, ready for the millwright. The casting is loosened from the wobbler, and the crane carries the roll changer to its appointed place of storage. For convenience of storage, the roll changer can be so constructed that it may be folded back upon itself and occupy little space when not in use.

Three Recently Developed Die Heads

A new type of self-opening die head designed to cut extremely short threads as well as ordinary lengths, both fine and coarse pitch, and large and small diameters on hand screw machines, turret lathes and other machines on which the tool is not revolved, has been brought out by the National-Acme Mfg. Company, Cleveland, Ohio. This is one of three types of die heads recently developed by this company. One of the other types is designed for ordinary threading work that is not extremely short on similar machines on which the tool is not revolved. These two types are generally known as hand die heads. The third series is designed for use on automatic screw machines, both cutters and other machines on which the threading tools revolve while cutting. Both of the hand die heads are designed for work of large and small diameter and fine and coarse pitch and to cut clear up a shoulder.

The three types have a number of similar features. They are simple in design and construction, having few parts. They do not have the usual cap over the face. This is omitted to permit the free circulation of cutting lubricant through the head so that grit and chips, which are quite likely to get into any die head, may be readily washed

finishing cuts can be taken. Smaller sizes are provided with a knurled finger lever for releasing the chasers by hand.

In adjusting the regular hand die head on turret or hand screw machines after the die head is set in the tool slide or turret of the machine, the stop is screwed back out of the way and the first thread is cut to the length desired. Then the machine is stopped at that point with the chasers still engaged in the thread and the cam ring still bearing on the chasers. The stop is then screwed up and forced forward until the tool slide or turret is pulled back sufficiently to open the gap in the die head. The stop is further screwed up until the cam ring slides off the cammed chasers. When the gap is fully opened the chasers are released as the bearing arms of the cam ring slide down the bevels on the top of the chasers, and the chasers spring open and slightly back from the end of the thread.

In the short-thread tool the bearing arms of the cam ring rest on the extreme tops of the chasers on the edges of the square cut shoulders when the sides are closed for cutting. When the forward travel of the die hood or cup is stopped, and as the lead of the thread begins to pull the chasers forward, the bearing arms of the cam ring drop down to the shoulders of the chasers, releasing them in-



Views of Three New Types of Die Heads That Have Been Placed on the Market. From Left to Right They Are a Die for Cutting Extremely Short Threads, an Adjustable Die for Automatic Screw Machines and the Regular Hand Die Head for Use Where the Tool Is Not Revolved

out by the flow of the oil or compound. It is claimed that this feature with the simplicity of parts makes the heads practically self-cleaning, and that choking or clogging with the attendant delays is avoided.

Both series of hand die heads are the same in many of their important features, the principal difference being in the methods of opening and closing and in the design of the chasers. In the regular type the chasers are cammed on the top and beveled from the front to the back. The bearing arms of the cam ring slide up and down these bevels in opening and closing. In closing the hand lever works from front to back and operates the chaser blocks. In the die head for short threads the chasers are also cammed at the top, but are square shouldered from front to back instead of being beveled. As the bearing arms of the cam ring drop down on the square shoulders in the short-thread die head instead of sliding down bevels the opening action, it is emphasized, is quick and sensitive, making it possible with this head to get on an extremely short piece and cut the thread the full length and open the die without damaging the thread or shoulder. In closing the hand lever works sidewise and operates the cam ring. Adjustment is made through a screw against which the closing lever rests, the amount of adjustment being regulated by the graduated gauge on top of the head. When desired a small cam is provided at the base of the hand lever so that roughing and

stantly, this instantaneous action being equally sensitive on large and small diameters and on fine and coarse threads. When the forward travel of the die hood is stopped by the knockout stop and the proper length of thread has been cut, both types of hand die open automatically at the proper point on the next piece. If the length of thread must be exact a slight further adjustment of the stop may in some cases be necessary. The principle of fixing the travel and the point of opening for the hand die head by the adjustable stop applies to all types of machines, but the method of adjusting the stops must be governed by the construction of the machine.

The die head for use on automatic screw machines, bolt cutters and other machines on which the threading tool is revolved while cutting, is opened and closed automatically, while revolving, by a tripping device. On the maker's automatic the die head opens when the forward travel of the hood is stopped, the lead of the thread pulling the chasers in the body out of the bearing arms of the cam ring. In closing, as the turret of the machine moves backward, the hood or shell of the die head is held by the yoke of the tripping device, and the turret then pulls the die body and chasers back into the shell until the chasers come under the bearing arms of the cam ring, when the whole head moves back with the turret as far as it goes. The automatic head can also be used for knurling instead of thread cutting by the substitution of knurling

blocks for threading chasers. The operation is the same as for threading.

The chasers of the three types of die heads can be quickly taken out by removing the screws that hold them without disturbing any of the other parts.

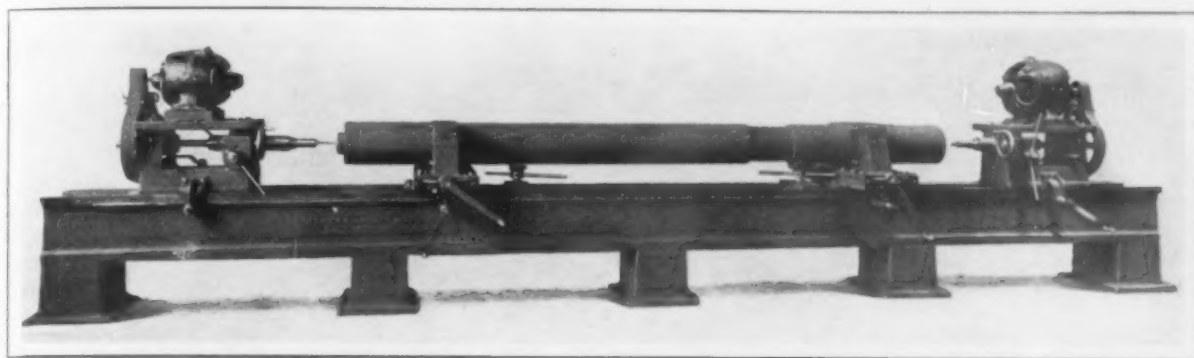
Shaft and Forging Centering Machine

To enable the centers of shaft and solid gun forgings to be determined quickly and accurately, the Detrick & Harvey Machine Company, Balti-

Motor-Driven Inverted Drilling Machine

A machine that reverses the customary practice and drills from the bottom upward is being built by the Foote-Burt Company, Cleveland, Ohio. It is intended for drilling 0.90 per cent. carbon billets 4 or 5 in. in diameter and 20 in. long. This departure from the usual arrangement, it is emphasized, possesses the advantage that the driving spindle is held rigidly at the bottom of the machine, and vibration is reduced to a minimum on the drill, which is of small size and 24 in. long.

In reality the head of the machine is a jig for



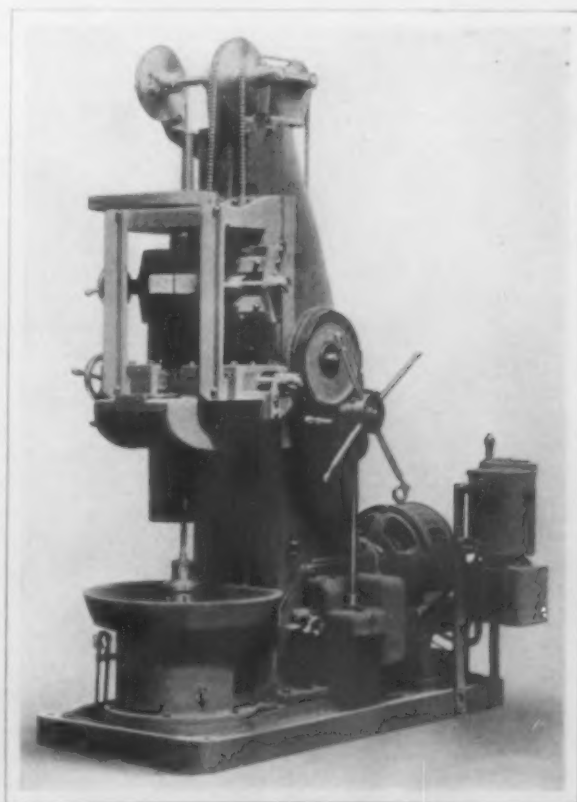
A Machine for Centering Shafts and Solid Gun Forgings Preparatory to Further Machining

more, Md., has developed a centering machine. As will be noted from the accompanying illustration, the machine consists of two headstocks and two vise carriages mounted upon a bed similar in design to that of an ordinary lathe. Both the carriages and the headstocks can be adjusted by hand through a rack and pinions to any position on the bed to accommodate various lengths of the work. It will noticed further from the engraving that in the vise carriages there is an internal wedge which is directly in line with the spindles mounted in the headstocks. In this way it is possible to adapt the machine for different pieces ranging from 2 to 14 in. in diameter, as when the vise is screwed in to accommodate the smaller sizes, the position of the wedge does not change and the stock is gripped so that the center line of the piece being handled is in the proper relation to the spindles.

Each headstock has a drilling spindle with ball thrust bearing and bronze bushed bearings. These spindles are directly connected by gearing with a rawhide idler to a 5-hp. adjustable-speed motor, with a range of from 3 to 1. Each headstock is entirely independent and the use of long high-speed shafts is avoided. The spindles have a fine hand feed which is controlled by a handwheel through worm gearing and a quick movement controlled by spider handles. The former is thrown in automatically when the operator has finished using the quick traverse. The spindles have a No. 4 Morse taper and the operating speeds range from 90 to 360 r.p.m. The vise carriages have two sets of steel grips to accommodate different diameters of work, the jaws being operated by the handle on the front of the vise. In addition to the vises there are two jack screws which may be placed on any portion of the ways. These are designed for use in chucking and supporting heavy work.

The machine will handle work up to a maximum diameter of 14 in. and a maximum length of 12 ft. The weight of the machine is approximately 16,000 lb. The equipment furnished includes oil pumps and the necessary piping for conveying cutting lubricants to the drill in one headstock and the counterbore in the other.

holding the pieces and two additional sets of jaws are provided to grip the upper and lower portions of the billet, this being relied upon to insure centering. An additional means for holding the billet in place is provided by a jack screw. The machine is driven by an 8½-hp. Westinghouse direct-current adjustable-speed motor, operating at from 800 to 1600 r.p.m. The speed control is secured by a Westinghouse drum type controller which is mounted on an iron framework attached to the rear of the machine bed adjacent to the motor.



An Interesting Type of Motor-Driven Machine for Drilling Long Small-Diameter Billets in Which the Drill Cuts Upward

A STATIONARY BOILER STOKER

A Locomotive Type with a Set of Crushing Rolls and Variable Feeding Mechanism

The Kincaid Stoker Company, 507 East Pearl street, Cincinnati, Ohio, has brought out a new type of stoker for stationary boilers. The apparatus is entirely self-contained and is hinged on a frame bolted to the boiler front. In applying this stoker to a boiler that is already installed, it is pointed out that the only changes required in the setting or the boiler front are the removal of the firedoor and the attachment of a firedoor frame. If desired, the stoker can be swung entirely clear of the boiler whenever it is necessary to clean the fire or for any other occasion that may arise. In the accompanying illustration the stoker is shown in position at the left, while the view at the right illustrates how easily it may be swung out of the way. The small insert drawing gives details of the construction and operation of the stoker.

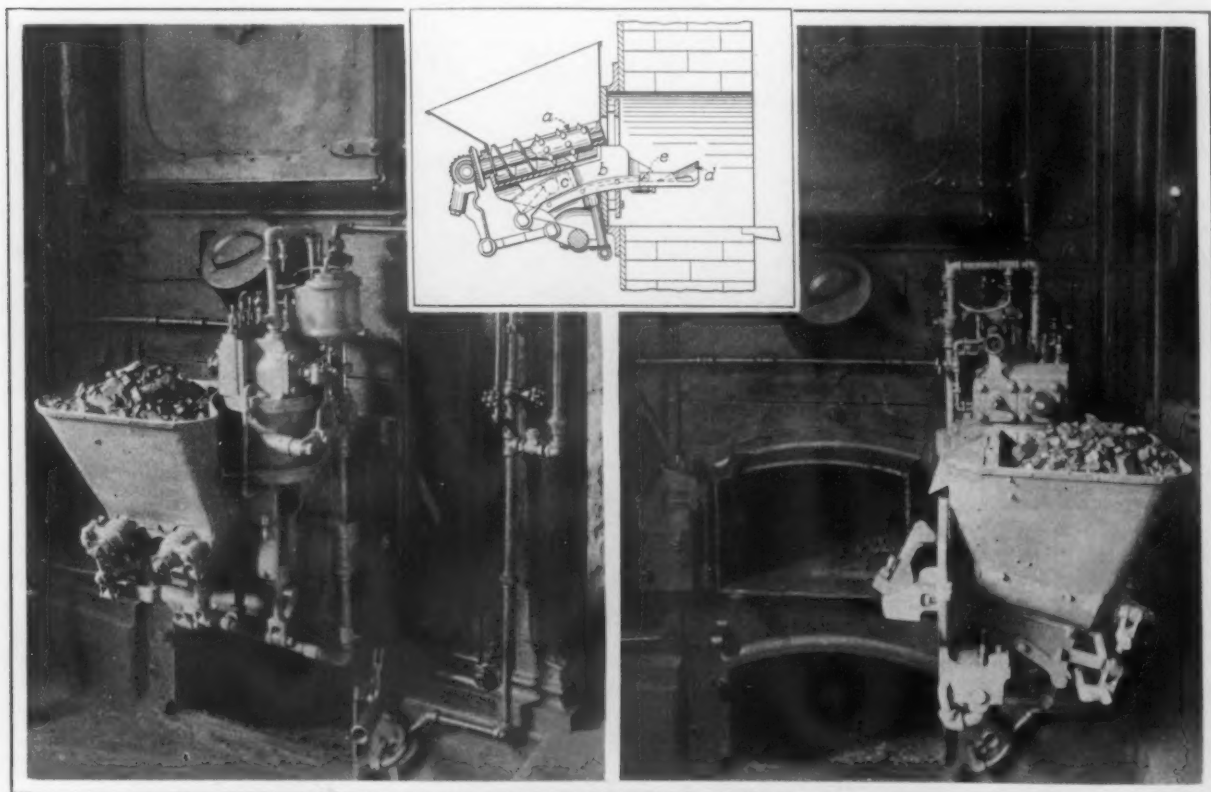
The coal is fed toward the furnace in certain predetermined quantities, varying between 3 oz. and 2 lb., according to the capacity of the furnace, by the worms and crusher rolls *a*. It is pointed out that the employment of crusher rolls makes it possible to use coal of any size from slack up to 8 in. across, as well as mixed sizes, such as run of mine, etc. After the coal has been crushed it drops into a rectangular space, *b*, directly in front of the ram *c*, which is actuated by a steam piston that can be seen at the right of the hopper in the left portion of the engraving. The worms *a* work intermittently, so that when the ram is delivering a blow against the coal in the space *b* no fuel is being fed forward. The movement of withdrawing the ram preparatory to the next blow causes the worms to turn through a predetermined portion of a revolution. This arrangement, it is pointed out, causes the same quantity of coal to be fed to the ram for each successive blow, this quantity being capable of ready variation by changing the throw of

the ratchet arm by which the worms are turned.

A rapidly acting valve admits steam to one side of the piston, which drives the ram in much the same way that air is admitted behind the piston of a pneumatic hammer. This arrangement is relied upon to give rapid acceleration, and at the end of the blow the piston is cushioned by a small quantity of steam trapped in the end of the cylinder, which is relied upon to eliminate any mechanical shock when the ram is brought to rest for the return stroke. The pressure of the steam admitted behind the piston is varied by an adjustable traveling mechanism to enable blows of four different intensities to be struck. The first or weakest stroke delivers the charge of coal over the front quarter of the fuel bed, a second-degree blow delivers the fuel to the next section of the bed and so on, the spreading being accomplished by the distributor plate *d*.

The exhaust from the ram cylinder is led to a rectangular nozzle, *e*, measuring $\frac{3}{8}$ x 3 in., and the cycle of events is timed so that a blast of exhaust steam emerges at *e* at the same time that a charge of coal reaches the distributor plate. The steam thus assists in spreading the coal over the various portions of the fuel bed, the intensity of the blast of exhaust steam varying directly with the force of the stroke of the ram. The character of the spreading is dependent upon the contour of the distributor plate *d*, which is varied to suit furnaces of different shapes and proportions.

Varying the number of charges of coal thrown per minute and also the size of the individual charges are the means employed to accommodate the fluctuations in the demand on the boiler, the former being the principal method employed. This change in speed is accomplished by a small steam pilot piston, the speed of which in turn is controlled by a small water resistance piston to which it is yoked. The resistance of the water piston is varied by constricting or enlarging the passage through which the water is forced to flow from one end of the cylinder to the other. This arrangement, it is pointed out, gives easy hand and automatic control.

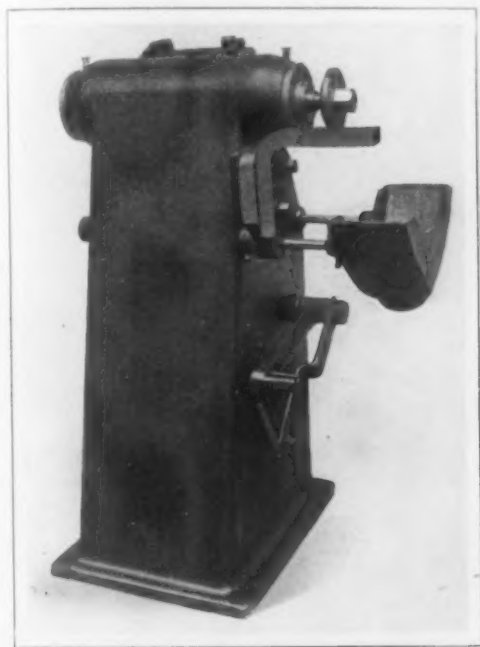


Two Views of a Stationary Stoker for Boilers Showing It in Position and Swung Back to Permit the Fire to Be Cleaned. The Insert at the Top Gives Details of Its Construction and Operation

A New Ball-Bearing Polishing Machine

A recent addition to the line of grinding and polishing machines built by the F. E. Wells & Son Company, Greenfield, Mass., is one equipped with ball bearings and designed for an underdrive. This latter feature, it is emphasized, affords complete protection to the operator, as the driving belt is entirely inclosed. Ordinarily the machine is driven from a shaft attached to the ceiling of the floor below that on which the machine is installed, although in the cases where the machine is used in a one-story building the shaft can be placed in a trench and the bearings supported by the floor stand, this being the arrangement used by the builder in its own plant.

The spindle runs in SKF ball bearings, inclosed to exclude dust and grit. The machine as illustrated is shown equipped for grinding with a short spindle, which brings the wheels close to the bearings. An endless belt is used to drive the machine, an idler



A Recent Design of Polishing Machine Equipped with Ball Bearings and an Under Drive from the Floor Below

pulley located inside the bed being employed to tighten the belt when it is desired to start the machine. The handle at the side of the machine operates this pulley, being raised to bring the idler into contact with the belt and lowered to stop the machine.

The principal dimensions of the machine are diameter of spindle, $1\frac{1}{4}$ in.; height of spindle from floor, 36 in.; size of base, 17 x 22 in., and net weight of machine, 510 lb.

Another machine is being built with the drive from an overhead countershaft. It is the same as the one illustrated, but will weigh 425 lb. When either machine is arranged for grinding the spindle is $36\frac{1}{2}$ in. long and projects 7 in. on each side, while when used for polishing the spindle is 48 in. long and projects 13 in. on each side.

Ellsworth Haring has opened an office at 114 Liberty street, New York City, as a steel specialist. He will handle metals and specialties of various kinds, and in addition is prepared to give advice as to the grade of steel best suited for any particular purpose. The lines handled include high-speed and tool steels, steel balls, magnet, sheet and strip steels, drill rods, wire, nickel, forgings, hack saw sheets, etc.

New Arbor Press for Automobile Work

For handling heavy work in automobile factories, repair shops, etc., where high power and rigidity are essential factors, the Atlas Press Company, Kalamazoo, Mich., which has succeeded the G. T. Eames Company, has placed two types of arbor presses on the market. Several improvements have been incorporated in the design of these two presses, which are designated as the No. 26 and 28 sizes. Among these are the ability to adjust the swinging plate over the opening in the base to accommodate any size of work readily, the employment of a very long bearing for the ram and ready access to the front of the machine from all directions. A lock is provided for the ram, which is relied upon to keep it in any position that may be desired.



A Recently Developed Arbor Press That Is Especially Adapted for Automobile Work

Chuck Company Reorganizes and Expands

The Cushman Chuck Company, Hartford, Conn., whose founder and president, Austin F. Cushman, died November 29, 1914, has been reorganized. Eugene L. Cushman, son of the founder and secretary and treasurer of the company since 1885, has been chosen president and a new board of directors has been elected. The officers and directors follow: President, E. L. Cushman; vice-president (newly created office), A. P. Sloan; treasurer, Richard Cushman; secretary, Frederick H. Dean; directors, E. L. Cushman, A. P. Sloan, Arthur E. Cushman, Richard Cushman and Harry E. Sloan. The new directors are: A. E. Cushman, Richard Cushman and H. E. Sloan, all of whom have been with the company many years. A. P. Sloan, who has been superintendent of the factory, becomes works manager and Harry E. Sloan, who has been a foreman, is made superintendent. Mr. Dean, the new secretary, has been assistant secretary 20 years.

The company has bought from the American Hardware Corporation, New Britain, the plant formerly occupied by the Universal Machine Screw Company at 806 Windsor street, Hartford. After alterations are made the Cushman Company will remove from its present quarters at 30 Cushman street to its new building, which will permit of an expansion of the business. The property has a frontage of 351 ft. on Windsor street and 275 ft. along the tracks of the New York, New Haven & Hartford Railroad and contains 119,870 sq. ft. The building is of brick, one story, well lighted by overhead windows as well as side windows, and is 160 x 197 ft. It has two wings, one 27 x 98 ft. and another 31 x 60 ft. The total floor space is 28,360 sq. ft. Among the alterations to be made is the enlargement of one of the wings so that it can be used for office purposes. The alterations will be begun at once and the new owners will occupy the property early in the spring.

The Reeves Mfg. Company, manufacturer of black and galvanized sheets, etc., Canal Dover, Ohio, has purchased the entire business of the Ohio Stove Pipe & Mfg. Company, New Philadelphia, Ohio, including all its patents, machinery, manufactured stock, and good will. The company taken over has been one of the leading makers of stove pipe and elbows for some time, and its acquisition will greatly increase the Reeves Company's already extensive line of nested stove pipe and stove pipe elbows.

Special Ball Bearing for Lighthouse

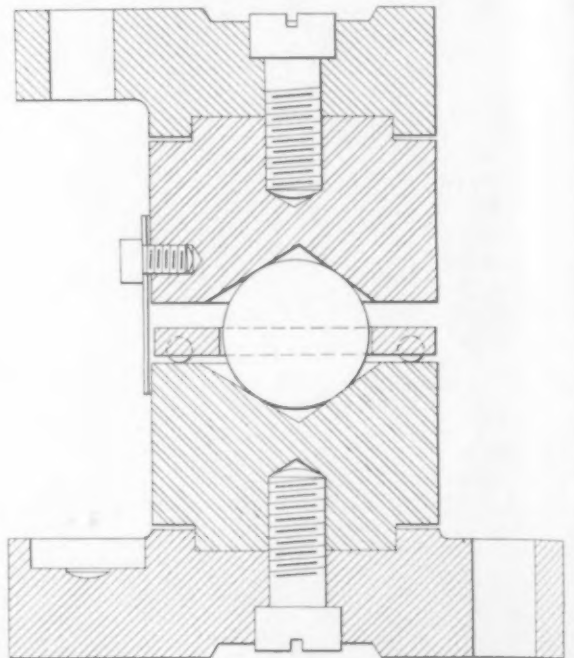
The Auburn Ball Bearing Company, 21 Elizabeth street, Rochester, N. Y., has supplied some special ball thrust bearings to the United States Government. These will be used at the Jupiter Inlet Lighthouse, Florida, to revolve the flash panels which give the light its distinctive periods of light and darkness. The bearings were made in accordance with the Government specifications, and among the interesting points embodied in their construction are the use of four ball bearing jacks to raise the upper races out of contact with the balls.

The ball grooves are made according to the builders' four-point cone contact principle, the shape of the groove being indicated in the accompanying line drawing. The ball races are of inserted tool steel and are ground to parallelism. They fit into flange rings of cast iron. After the races were ground they were tested with a template for the proper angle, and a further test was made by coating each race with red lead and rotating it with the balls in place, the specifications covering this work requiring that each ball should show only two circles on it after several rotations of the race. Balls $1\frac{1}{4}$ in. in diameter were used, there being 36 in the bearing. The ball cage ring was made from a single piece of brass, the upper and lower faces being finished exactly parallel. To facilitate the movement of this ring, 32 balls spaced equally in pairs around the inner and outer edges of the ring are used. To guard against the entrance of dust into the bearings a dust protector of hard sheet brass is secured to the upper track with screws.

To remove the load from the balls when the light is not in operation and thus give them a chance to recover from the fatigue of the heavy load to which they are subjected when the flash panels are being revolved, four ball-bearing jacks are provided. These are shown in the halftone engraving, and one in the foreground has been removed, showing the construction of the jack and the arrangement of the bearing for it. To prevent the balls from falling into the hole when the lower end of the jack is removed from its normal position, a brass tube $\frac{3}{8}$ in. in diameter is forced into the base. In connec-

tion with each jack, nine balls $\frac{3}{16}$ in. in diameter are used.

The external diameter of the bearing is 25 in.



A Partial Sectional Elevation Showing the Arrangement of the Various Parts and the Special Ball Bearing for the Ball Cage Ring

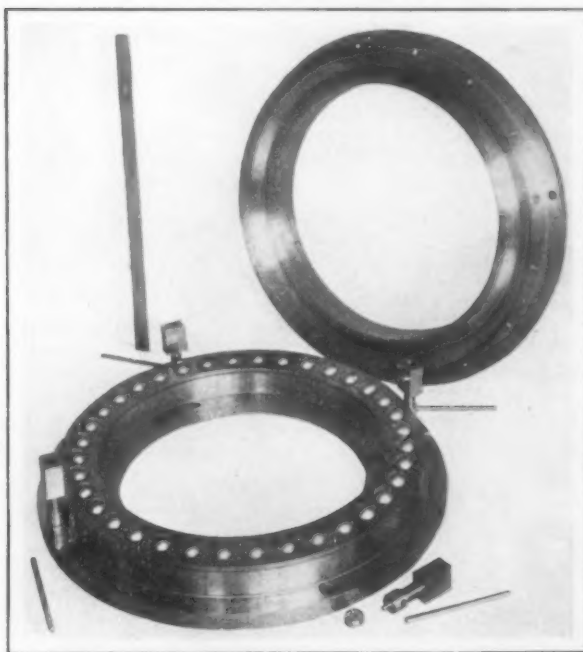
and the inner diameter is $17\frac{1}{2}$ in. The distance between the centers of the two rings of balls is 20 in.

Cast-Steel Motor Truck Wheels

The demand for a strong and enduring cast-steel motor truck wheel directed attention at the Automobile Exposition in New York last week to the wheel made by the West Steel Casting Company of Cleveland, Ohio. Wheels from the West foundry were shown as adapted to 3-ton, 5-ton, $7\frac{1}{2}$ -ton and 10-ton motor trucks. In recent years French and Belgian cast-steel truck wheels have been imported into this country, but it is understood that they have not given good results in service, due either to the quality of the casting or the design. The wheel produced at Cleveland is of steel made by the converter process and is understood to be a specially treated or alloy steel of medium carbon content. Unusual precautions in molding and cooling are essential in turning out an acceptable product. The steel varies from 65,000 to 75,000 lb. per sq. in. in tensile strength, with an elastic ratio of 55 to 60 per cent. and good ductility. Ready for tires and accessories, the wheel weighs 100 lb. less than the corresponding wooden wheel and the cost is less. About 8000 of these wheels are now in service and none have thus far failed.

Record of a Cast-Steel Piston Rod

An unusual record of a cast-steel piston rod for a Chambersburg type of steam hammer has been noted. It was necessary to make repairs to the hammer in the shortest time possible, and as it was impossible to secure a forging of alloy steel just then, the Federal Steel Foundry Company, Chester, Pa., cast a rod of basic carbon steel, made from selected grades of low-phosphorus pig iron and scrap, the furnace practice of this foundry calling for the production of basic steel from acid scrap in a basic open-hearth furnace. Two rods were cast. One of these has been in use in the steam hammer for two and one-half years, operating at times both day and night, straightening engine frames, etc. It is reported to be in excellent condition to-day and has exceeded the expectations of its producers and the predictions of experts.



A Special Ball Thrust Bearing for Lighthouse Service Equipped with Elevating Jack Screws to Relieve the Strain on the Balls When They Are Not in Use

The Spacing Table In the Structural Shop

Equipment in Fort Pitt Bridge Works—Light Signals for Changes in Punching—Method of Attaching Gag Holders—Clamps for Guiding Angles

BY GEORGE P. THOMAS

About a year ago the Fort Pitt Bridge Works, Pittsburgh, Pa., whose plant is located at Canonsburg, Pa., installed a Thomas spacing table built by the Standard Bridge Tool Company, Pittsburgh. The machine was designed particularly to take care of plate punching, the company having about two years ago installed a similar machine, which is now used largely for punching angles. These machines are used for punching all classes of bridge and structural material, such as chord angles, web plates, cover plates, etc. Attention is called to some of the interesting features of this equipment, some of which are illustrated.

The punching operation is entirely automatic,

ing the gags and eliminates possibilities of mistake. On bridge and structural work, however, on account of the frequent changes, the gags are usually controlled by hand levers and to avoid mistakes a signalling system is used to indicate the point where important changes occur.

The movement of the punch itself and the spacing carriage is synchronized, the carriage moving forward the instant the punches clear the material after stripping. The speed of both the punching machine and the spacing carriage is arranged so that on the shorter spacings the punch runs continuously. On the longer spaces where the carriage cannot travel fast enough to bring the material to

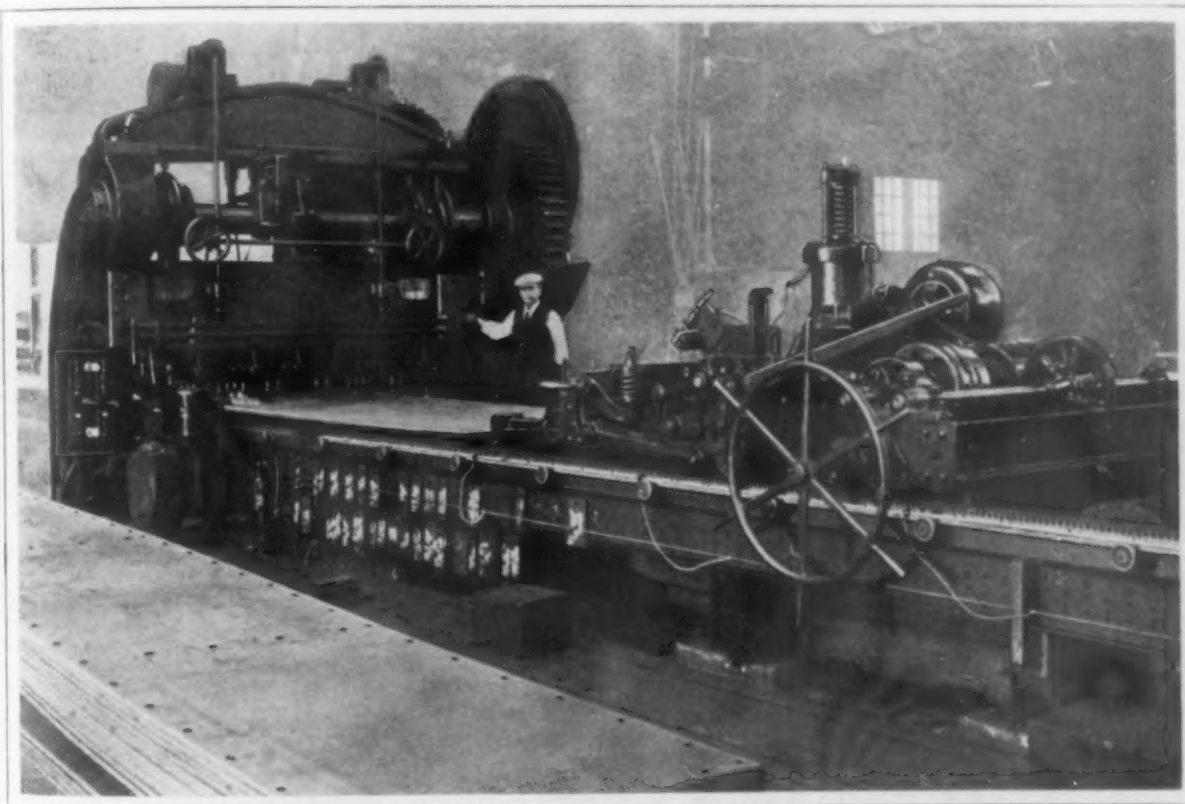


Fig. 1—The Little Pegs in the Wooden Templet Provide for Stopping the Carriage Where Necessary and the Wired Contacts Flash Lights Shown at Left of Machine as a Signal that a Different Set of Punches Must Then Go Into Action

except for the actual working of the gag-controlled punches on the punching machine. On bridge and structural work, as the number of duplicate pieces to be punched for one job is, as a rule, comparatively small, the necessity of quickly setting up both the punch and spacing table for changing from one job to another is apparent. In designing these machines, this has been kept constantly in mind. On the punch it involved considerable departure from the ordinary standard design of punches, particularly in the design of the ram.

On steel car work where large number of duplicate parts are obtained, the gags are ordinarily controlled automatically by means of a drum operated from the main shaft of the punch. This entirely relieves the operator from the work of operat-

ing the next stopping point, the clutch on the punch is automatically disengaged, but is again brought into engagement the instant the carriage locks at the next stopping point.

This outfit is controlled from the left side of the punch by means of an ordinary drum-type controller and two double-throw switches, all suitably located within easy reach of the operator. Thus, if for any reason a quick stop is required, it is only necessary to throw out one of the switches and the punch immediately stops and the carriage, if traveling, remains stationary at the next stopping point. Throwing the switch back into position again starts the operation.

The spacing movement of the carriage is controlled by means of full-size templet located on the

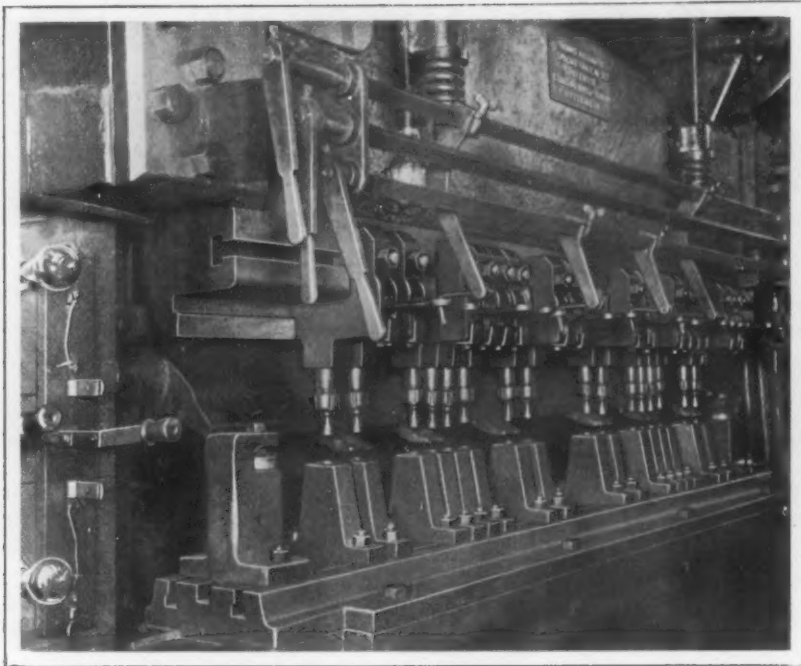


Fig. 2—Gag Holders Are Fastened by a Single Bolt. The Controlling Levers Are Shown and at Left May Be Seen the Signal Lights

side of the table. The stopping mechanism is actuated by the small steel pins in the templet, shown in Fig. 4, and the release of the carriage for the next movement forward is made automatically by means of contact switch mounted on the shaft of the punch. This switch is set to release and start the carriage at the moment the punches strip the material. The templet is a strip made of regular templet lumber usually about $\frac{3}{4}$ in. thick and $2\frac{1}{2}$ in. wide and is ordinarily made in sections, the length of the boards. Two rows of spacing pins are usually provided on each templet, the spacing carriage equipped with two paddles. This applies particularly to angles where the spacing on each leg is usually different and the spacing for both is provided on the same strip. These strips are used over and over again on both sides, as long as the pins will hold. When spacing with one line of pins the paddle for the other line is locked out of engagement.

Changing the templet is a very simple operation and takes but a few moments. When arranging for punching the parts of a plate girder, sections of templets are provided for the full length for punching the chord angles and the cover plates. For the webs only, sections the length of the plates are used. If several cover plates are required, which are usually of different lengths on standard designs of girders, the same arrangement is used and only parts of the templet set up. The sections used are, of course, shifted to the proper position on the table. The advantages of using the same templet for punching these different members which are to be assembled together is obvious.

The gags on the punch are controlled by three levers and can be operated from either side of the punch. These levers can

be increased in numbers if necessary. To indicate to the operator where holes for stiffeners or other changes occur in the travel of the material in punching, flashlight signals are provided, as previously mentioned. These lights are shown located near switches on the punch. The circuit is made at the desired points, by means of a contact carried on the carriage and others fastened to the templet, which in turn are connected to signal wires running the full length of the spacing table. These parts are clearly shown in Figs. 1 and 4.

For punching the plates shown on the floor along side of the table in Fig. 1, flash signals consisting of contacts fastened to the templet are provided at every point where the transverse holes are located. This indicates to the operator that all gags are to be thrown in at these points. The other parts of the signals

are permanent parts of the machine.

Two near views of the front side of the punching machine are shown in Figs. 2 and 3, one showing the punching tools set up for punching plates and the other for punching angles. The special design of the gag holders will be noticed in Fig. 2. These are fastened to the ram of the punch by a single bolt. The strain of punching is transmitted direct to the ram of the punch through the gags and the tension caused by stripping is carried by projections on the gag holders, the bolt merely holding the holders in a horizontal position against the face of the ram. This arrangement of tools permits quick setting and close spacing and also permits removal of any unit without disturbing the others.

On these machines, angles are punched back to back, two pairs at a time. Means for gauging are shown in Fig. 3. These consist of sliding parts,

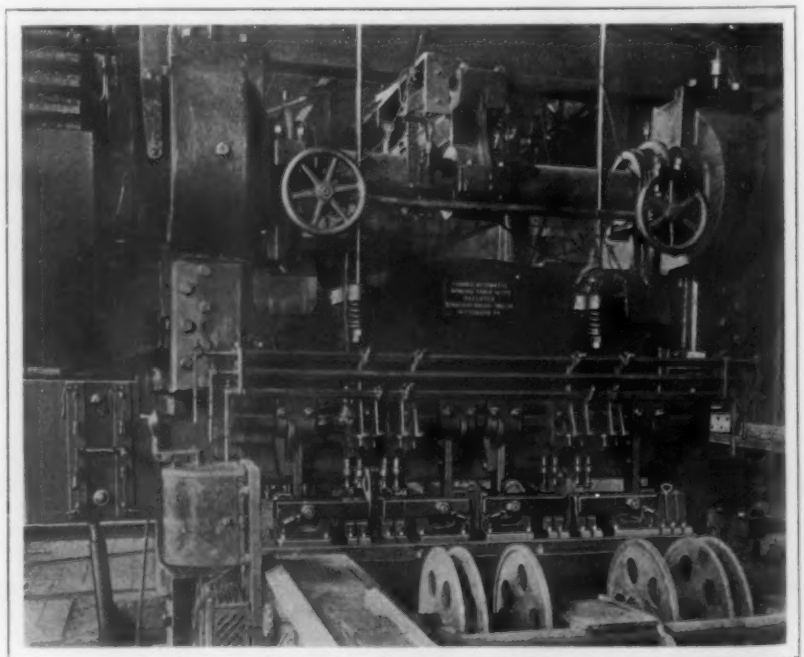


Fig. 3—The Machine Is Shown Rigged for Punching Angles, Having Sliding Parts to Bring Each Pair of Angles Back to Back. The Flash Lights and the Drum Type Electric Controller Are at the Left

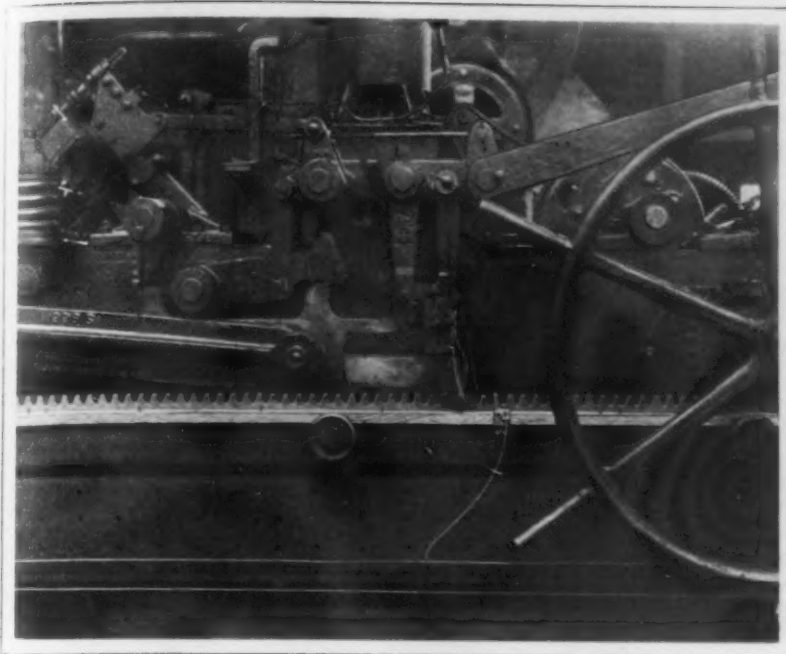


Fig. 4—A Near View of the Carriage Showing the Pegs in the Templet and the Contact for Securing the Light Signal for a Change in Punching

located on each side of the die holders, with a roller located to one side. In descending, the ram of the punch by means of cam motion acting on the rollers, pushes these parts forward, thus bringing the two angles tightly together and in the proper line for punching. With the ascending movement of the sliding head, the gauging parts are brought back to the starting position by means of small tension springs.

The cam motion is so arranged that the gauges are closed before the punches strike the material and are again opened as soon as stripping occurs to allow free forward movement of the material. Angles coming from the mills are seldom straight and to avoid undue friction on the carrying rolls, these are held in position on the shafts by means of springs. This permits the rollers to adjust themselves sidewise to the irregularities of the material.

In punching heavy angles, the strain on the gauging clamps is very great, as this class of material tends to curve and stretch. However, with this arrangement two pairs of the heaviest angles up to 90 or 100 ft. long are punched with comparative ease and the material comes out practically straight.

Plates are much easier to handle. It is, however, essential to keep them free of the dies and to clear the fins caused by punching. These fins are likely to be particularly troublesome if the punches and the dies are not exactly central with each other and the material happens to be soft by interfering with the movement of the spacing carriage. To avoid trouble from this source, rollers mounted on springs and located as near the dies as possible are provided. These rollers are designed to carry the material about $\frac{1}{8}$ in. above the dies. The same trouble occurs in punching angles, but to a less extent and the same means are used to free the material from the dies.

STRETCHING OF MATERIAL IN PUNCHING

One particular advantage to be noted from the use of spacing tables for punching material, aside from the reduction in cost of punching, elimination of marking, templet making, etc., is the accurate spacing of holes in material stretching in punching. It is obvious that on these machines whatever

stretch occurs is thrown to the rear and can be sheared after punching.

It is necessary in punching this class of material to centers by the old method to allow for the stretching. The templet maker estimates the amount of stretch, basing the allowance on previous experience and makes the templet for marking correspondingly short. It is obvious that this system is a mere guess and it is impossible to estimate, even closely, how much the material will stretch and get accurate punching.

Cover plates 80 to 90 ft. long will stretch frequently over 1 in., varying with the toughness of the material, a thick, soft plate stretching considerably and a thin hard one, very little; and no plates of the same size stretching exactly the same amount. In punching angles these conditions become much worse on account of the curving and consequent straightening.

The angles are first stretched in punching and stretched again in straightening and to make matters still more difficult these operations on each leg occur at different times.

The spacing table removes all this guess work. No account whatever is taken of the stretch and the templet strips are made exactly to blueprint. Cover plates 30 ft. long or 90 ft. long are punched exactly to the templet and whatever stretch develops shows up at the end of the material and is sheared off. The accuracy of spacing obtained on these machines was demonstrated, for example, in the case of eleven plates $60\frac{1}{2}$ in. wide, $\frac{9}{16}$ in. thick and 21 ft. long. Holes were punched to $\frac{15}{16}$ in. and a $\frac{7}{8}$ -in. bolt was inserted loosely in every deep hole formed by the group of plates placed together face to face. On one job involving large tonnage for a leading railroad in the northwest, with material all punched on these machines, only three holes required reaming out of 67,000 field holes.

It is difficult to give figure for cost of punching on these machines, as so many elements have to be considered. Cost of labor, number of duplicate pieces, number of holes and the size of pieces, facilities provided for handling the material on and off vary with every shop. The factor of handling, however, is very important and has great bearing on the output of the machines. Usually it takes longer to handle the material than it takes to punch it. On short material sometimes the proportion being one for punching to three for handling. Cases have been found in some shops where the saving in the cost of punching was practically lost in the handling.

The spacing table is covered by United States and foreign patents, as are also the design and method of attaching the gag holders to the ram of the punch with a single bolt, the gauging clamp for guiding angles, the system of carrying rolls, etc.

The State Industrial Board of Pennsylvania has arranged for a meeting of the committee in charge of drafting regulations for safety in blast furnace, iron and steel plants throughout the State, which when approved will have the same force as law. The meeting will be held in Pittsburgh January 20.

Scientific Management in the Office*

How Time Studies and Task Setting in Duplication Work Have Succeeded—Schedules for Executives—Basis for Bonus Payments for Messengers

BY ROBERT T. KENT

It is seen from the foregoing that it is a comparatively simple matter to apply the principles of Taylor to routine work in the office, which is largely repetitive. At first sight it does not appear such a simple proposition to apply the same principles to work which is subject to interruption, or which varies from day to day and hour to hour. A little reflection, however, will reveal that nearly every type of office work can be analyzed to show that it contains some standard elements. For these standard portions tasks can be set, and the rest of the day filled with unstandardized work.

TASK WORK FOR THE STENOGRAPHER

As an instance, time study will show the length of time a stenographer should require for the trans-

NG3
7:30 - 7:45
1. - Sort out Pattern Covers, Impression Bds. and Die Room orders. Place together and deliver to Die Room.
2. - Sort out Route Sheets Specifications Stitched Patterns, R & B Patterns. Place together with Mfg. Orders
3. - Check up patterns on Mfg. Orders.

Fig. 6.—The Messenger Has Definite Duties for Each Period. The Time of Beginning and Ending the Work is Stamped On the Card for Each Period

scribing of an average letter. For the sake of argument, assume it to be 3 min. for a letter covering three-fourths of the ordinary letter sheet. This is about the average length of the letters written in a business office. The task time for the stenographer on correspondence, for writing 25 letters, would be 75 min., plus the time consumed in taking the shorthand notes. It would be unfair to the stenographer, as well as impractical, to attempt to set a task for the taking of dictation. It is entirely practical, though, to ascertain the time spent in dictation, and to require that the dictation and transcription be completed, in the case in point, in the dictation time plus 75 min. If the work is done in this time, the bonus for correspondence is earned; otherwise it is lost. The same scheme can be applied to many other forms of office work, which apparently are as difficult of standardization as the work of a correspondence stenographer.

SETTING TASKS ON INTERRUPTED WORK

A modification of the above idea is the allowing of credits for task work which is interrupted at more or less frequent intervals. Thus at the Plimpton Press the clerk who writes the operation tickets

also makes out stores issue tags, or requisitions on the store room. The nature of the business is such that these tags must be written on demand. When tags are needed the clerk must drop the work in hand, whatever it may be, and write the tags. Interruptions for this purpose are frequent and of varying length. The elapsed time, therefore, for writing a given lot of operation orders will, as a rule, exceed by a good percentage the task time allowed for this work as shown by the table of Fig. 5. Ordinarily the circumstance of elapsed time exceeding task time will cause the employee to lose bonus. In this case provision is made for crediting the employee, first with the task time set for the operation orders, and second, with the time lost by writing the stores issue tags. The employee is not, however, permitted to lose as much time in this last work as he may see fit. While the amount of writing varies with different tags, careful time studies, made over a long period of time and covering every class of tag, have shown that 1 min. per tag is a fair allowance for this work. The tags are written in duplicate, one of which remains in the planning room. At the end of the day the tags are counted and the employee is credited with as many minutes as there are tags. If the difference between the elapsed time on the operation orders and the credited time is equal to or less than the task time, the employee will have earned bonus; otherwise, not.

This may be somewhat clearer by a numerical example. Assume that the operation order clerk finds, in the morning, a series of tasks of writing operation orders laid out, the total time allowed for which is $7\frac{1}{4}$ hr., or 425 min. The record at the end of the day shows that $8\frac{1}{2}$ hr. (510 min.) were required for this work. The cost department, however, finds that during the $8\frac{1}{2}$ hr. the clerk also wrote 92 stores issues tags. Therefore, the actual time charged to the clerk for the writing of the operation orders is $510 - 92 = 418$ min., or well within the task time. The clerk is therefore entitled to bonus for the day. If, on the other hand, the clerk should have been found to have written but 52 tags, the calculation would be $510 - 52 = 458$ min., and the bonus would be lost.

USING A SCHEDULE AS A TASK BASIS

There is one class of office work for which it would seem exceedingly difficult to set tasks—that is the predicting of a definite number of minutes in which each piece of work should be accomplished. This is the work of an executive or semi-executive character, comprising conferences, the issuing of directions to subordinates, handling of correspondence and similar duties. Usually, however, every person doing such work has certain definite duties which must be attended to each day. In this case the task can be based on the performance of these duties at the time which will be most productive of benefit to the executive's associates. This naturally leads to the preparation of a time table, showing exactly what is to be done, and the approximate hour at which the various duties should be completed. Living up to this schedule will mean the performance of the task; failure to keep to the schedule

*Concluded from page 86 of *The Iron Age*, January 7.

will mean the failure of the task and the loss of bonus.

As an instance of the operation of a schedule, the chief clerk of the planning room has certain duties which must be completed at definite hours and in a predetermined order, to prevent confusion among the other workers in the room. We have already seen how the preparation of work orders depends upon the preparation of route sheets. Therefore it is essential that the work of preparing route sheets be started at as early a moment as is practicable each day. To do this involves an analysis of the specifications to determine what combinations of route sheets are necessary for the production of orders received that day. The schedule of work for this official, therefore, provides that specifications first be analyzed. Based on the maximum number of orders that the plant is likely to receive in one day, a time at which this analysis should be completed may be fixed. Following this, the work of preparing route sheets is apportioned to the workers in the planning room, this also to be completed at a predetermined time. Next, the operation orders are assigned to the clerks who will write them, and the time at which this assigning is to be finished is also fixed in advance. This policy is pursued for all the routine work of the day, the intervals allowed being sufficiently long to provide for all usual interruptions. The times set for the completion of each of the duties are so planned that the work will be finished in advance of the time that the next person to handle it is required to start. Thus there is no chance of any one remaining idle while the previous worker is completing his job.

It is quite evident from the above that a schedule of this sort will materially assist the smooth running of the work of the office. In the above it is easily seen that if the chief clerk did not adhere to the schedule and reversed the order of the duties to be performed in any case, or handled each one at the time most suited to his convenience, it would be possible for some of the subordinate clerks to run out of work, or to do work which was not, at the time, necessary and thus delay other important operations in the planning room or shop. It is remarkable how a definite time table will assist in cleaning up work ahead and increase the volume of business that one person can handle.

SCHEDULING MESSENGERS

The messenger service is handled at the Plimpton Press on a schedule basis similar to the above. The messengers have a regular set of duties laid out for them, to be performed in between trips. These duties are listed in the form of a standing order detailing exactly what is to be done and the time at which the messenger should do the work.

- 10:00-10:10. 1—Deliver pattern books from instruction clerk's desk to pasting assembly station.
2—Go to pattern folding work-place and get folded pattern signatures.
3—Go to bindery pattern bench for patterns and deliver to the specifications clerk.
10:10 to 10:30—Attend to work in "out" box and miscellaneous errands.
- 10:30-10:40. 1—Go to worked material stores for pattern sheets and deliver to pattern clerk.
2—Get worked material store keeper's list of material received and deliver to worked material balance clerk.
10:40 to 11:00—Attend to miscellaneous errands.
- 11:00-11:10. 1—Deliver pattern books from instruction clerk's desk to pasting assembly station.
2—Take oversheets from planning room pattern desk to make up bench.
3—Go to pattern folding workplace for folded pattern signatures.
4—Go to bindery pattern bench for patterns and deliver to the specification clerk.
11:10 to 11:15—Attend to miscellaneous errands.

The care with which these duties are laid out is shown by the accompanying extract from the schedule for one of the messengers.

In addition to the standing order the schedule is printed on "ticklers," one of which is shown in Fig. 6. These ticklers are posted in duplicate each day on a special messenger bulletin board. At the beginning of each period the messenger removes the ticklers covering that period from the board and stamps the time upon them with a time stamp, returning one to the bulletin board to show to all concerned what duties he is engaged on at that time. When he has completed the duties called for by the tickler he again stamps the time on original and duplicate and turns both in at the desk of the route clerk who is his superior. At the conclusion of the day he signs the daily report shown in Fig. 7 and turns it in.

The bonus received by the messenger is based upon the accuracy with which he performs the duties called for by the ticklers. Bonus is lost if he loses 10 points in the week. Points may be lost if he fails to stamp the time of beginning and finishing work within the period called for, by failing to attend to errands properly, by failure to place a ticket on the bulletin board to indicate that he is

NG3
5:15
DAILY REPORT

Duties as stated on ticklers for
to day have been attended to at
the time given.

Signed _____

Work of Messenger Approved _____
Spec. Clerk

Approved _____
Route Clerk

Fig. 7.—At the Conclusion of the Day, He Signs a Daily Report and His Bonus is Based in Part on Accuracy and Reliability in this Connection

engaged on errands outside of the room, or by carelessness or mistakes in handling orders.

ACCOUNTING DEPARTMENT

The accounting department presents a problem which in certain of its aspects is comparatively simple and yet in others more difficult than any other branch of the office. The work consists almost entirely of the making of entries in the account books, posting these entries from one book to another or from original data sheets. Time studies have ascertained a fair time allowance for each particular class of entry. Hence, it is a simple matter from the standpoint of volume of work to set tasks in the accounting department. Volume may be and is a desirable characteristic in the accounting department. Inaccurate records are but little better than no records at all, and the provision of a task in the accounting department should therefore provide not only for a given volume of work but for unvarying accuracy.

The accuracy of the accounting department can only be determined when the books are closed at the end of each monthly or semi-monthly period. The bonus is fixed by the employee having performed satisfactorily and on time all the work required during the month and at the same time hav-

ing this work free from errors. The setting of definite tasks in the accounting department, however, is only in the formative stage, although the indications are that it can be done in this department just as successfully as it is in other clerical departments of the factory.

GENERAL CONSIDERATIONS

The work done in applying the principles of scientific management to the office force at the Plimpton Press has demonstrated that office workers are susceptible to the same general principles of management as shop workers. Office workers have the same failings as the shop worker. Among these may be mentioned a tendency to forgetfulness, a desire to do the easiest job first and the adoption of a method of working best suited to the ideas or convenience of the worker, irrespective of whether this method is the most desirable one or not. The methods in use at the Plimpton Press eradicate these failings. Forgetfulness is eliminated by abolishing the use of verbal orders. All duties for each worker form the subject of definite written operation orders showing exactly what is to be done and indicating either by means of a schedule or by its position on the bulletin board when it is

to be done in relation to the other duties of the day.

The best and most economical method of working having been discovered by careful, painstaking time study, all workers are required to conform to this method until a better method has been found and proved by time study. This method is fixed and rendered permanent by reducing it to writing in the form of standing orders or instruction cards with which each worker is required to familiarize himself. Nothing is left to chance, and by making all duties and methods the subject of a permanent record, the organization is stabilized and the absence or dismissal of any employee will fail to disturb the smooth progress of the work.

In addition to all the above beneficial results, remarkable economies have been effected in the operation of the planning room and office. Definite figures covering the operation of the entire office are not available. In one instance, however, by standardizing the work and setting tasks two men now do what required from four to six under former conditions. The two men are able to handle the work easily and without fatigue, due to the simplification of the work and the adoption of standardized methods. In addition they are able to earn considerably more than under former methods.

The British Iron and Steel Trade in 1914

Finished Materials Advance, But Galvanized Sheets and Tin Plate Are Hard Hit—Light Buying of American Steel

(From Our Regular Correspondent)

LONDON, ENGLAND, December 29, 1915.

The pig-iron market was really very steady, taken all round in the year now ending, and for the most part prices have stood close to the 51-shilling mark (\$12.41), with minor fluctuations. Only a moderate business has been done, but nothing more than this could be expected, for in the earlier part of the year trade conditions were not at all good, while the outbreak of war at the beginning of August introduced elements to which the present generation was happily a stranger. Under the fears that foreign ore supplies might be shut off entirely there was an upward movement of about 1s. 6d. (36c.) in Cleveland cash warrants on August 10, the price closing at 53s. 3d. (\$13.02), against 51s. 8½d. (\$12.53) at the previous close. But this was the extreme figure attained, and from then onwards for some time there was a drooping tendency. Sentiment was impaired by the closing of markets in all directions, and by the practical stoppage of so many good and important centers on the Continent, while in countries not actively engaged in hostilities there was financial stringency, which for a time absolutely paralyzed trade. In the latter part of the year the feeling improved steadily and the chances are that by degrees a period of wholly abnormal activity and prosperity will be ushered in. The enormous destruction in Belgium and northern France will require the expenditure of tens of millions sterling to make good even in part, and this will necessitate the using up of huge quantities of metals of all kinds, in which naturally the place of first importance will be occupied by iron and steel.

That our pig-iron trade was severely hit by the war may be told from the shipments from the Tees,

which for the eleven months up to November 30 amounted to 906,000 tons, compared with 1,140,000 tons last year for the same period. The home trade took 420,000 tons and the exports were 486,000 compared with 455,000 tons and 685,000 tons respectively in the corresponding period of the previous year. Latterly the position has been rendered more difficult by the stoppage of shipments to Scotland, owing to naval necessities demanding the closing to navigation of the Forth. Warehouse stocks, however, are small and the tone is pretty hopeful.

AMERICAN PIG IRON CUTS A SMALL FIGURE

It is a point worth recording that in spite of the trade depression in the United States, the exports of pig iron from that country were of not the least account so far as British industry was concerned. It had been feared from time to time that the day was at hand when active American competition might be expected in this direction, but such was not the case. As for Germany, her export iron trade ceased to exist for all practical purposes with the declaration of war, and the production there has been cut down by two-thirds. What Germany's iron and steel works will retain of their connections after the war is over remains to be seen, but a portion of their trade will prove to have been lost for a generation at least.

FINISHED IRON AND STEEL

In the finished iron section there has been very little move in prices, although the war gave a temporary appearance of excessive strength based upon frightened anticipations of a scarcity of material, should Germany rule the seas. As it happened, the iron trade generally did not suffer from the activi-

ties of the German fleet, and it was not long before the market assumed a more normal appearance. Marked bars have all along been in pretty fair demand, but common material has been for the most part easy to buy, though makers have been slow to reduce their prices from the enhanced level declared after war broke out. The cutting off of all German and Belgian material should be ultimately, when things settle down, of immense advantage to the British iron trade. Not only should Staffordshire and other parts benefit, owing to the home trade being thrown open wide to them, but the export business formerly done by our continental competitors should also fall into their laps. This was a most important connection with such markets as India and Japan, and the present is literally the chance of a lifetime for the British trade.

Steel movements and influences have been very similar to those affecting finished iron. The closing of the seas to the enemy has been a most important thing for us, and we are bound sooner or later to reap the full benefit. The production in Germany and Belgium has been cut down by fully 70 per cent. since the war broke out, and it will take a long time to rectify matters. There is a scarcity of men all over Great Britain owing to so many being called up to the colors and industrial establishments will find it no easy job to get sufficient labor when peace once more appears. In Germany the immense losses of men in the fighting lines will set back the clock for years, apart altogether from the ruinous expenses incurred.

GALVANIZED SHEET TRADE SUFFERS

There have been one or two outstanding features in the finished products side of the markets. For one thing, galvanized sheet makers have had a very poor time of it. Some years ago, under the influence of a trade agreement which was worked none too wisely, the productive capacity of the country was enormously increased, and later on the trade fell upon parlous times. Ultimately growing capacity took care of output, and this year things were shaping pretty well up to the war. True, prices had fallen below £10 15s. (\$52.31), steel and spelter being cheap, but with the outbreak of hostilities the galvanized sheet makers found themselves in an awkward position. They had contracted for tens of thousands of tons of German, Belgian and French sheet bars, not one ton of which could they obtain, and they had done the same thing with spelter. At one fell swoop they found themselves, from being comfortably covered in raw material for their sales of finished sheets, left absolutely and literally "bare" of their raw material. There was a frantic rush to cover and prices of domestic steel were rushed up while American spelter witnessed a similar movement, as much as £50 (\$243.33) a ton being reported paid for spelter for immediate delivery in August. Then the Government embargoed exports of galvanized sheets, and when permission was again forthcoming to ship goods, the financial panic and the interruption of sea connections to India and other markets by German cruisers put a further stop to business. Subsequently the War Office led the galvanized sheet makers to believe that it might require possibly 100,000 tons of galvanized sheets, and the makers covered themselves to this extent in costly raw material. Indeed, the excessive prices paid for steel and spelter were the direct result of the anxiety shown to provide for Government needs in sheets. Thus far, however, only a paltry proportion of the orders contemplated has been placed, and the chances of anything like the quantity indicated being bought by the authorities is

exceedingly remote. This has been a disappointment to American steel firms, who had entertained exaggerated ideas as to the possible requirements here in sheet bars. At the present time it is doubtful if the mills are working more than 50 per cent.

TROUBLES OF THE TIN PLATE TRADE

As for tin plates the market has been poor. For one thing, early in the year the growing capacity of German mills began to be felt in South Wales, and there were spells of American competition for oil-size orders; but on the whole things were moving slowly forward, under the shepherding influence of an association, which but for the war might have worked wonders. The war and the cutting off of supplies of Continental steel hit tin plate works, as it did the galvanized sheet makers, but since then the prohibition of exports to many important markets has been a hard blow. Germany has been buying canned foods for her army in Denmark, Switzerland and other neutral countries, which have to come to Wales, or at any rate which have hitherto come to Wales, for their supplies of plates. To put a stop to this, exports of tin plates have been embargoed to most parts of the European Continent. The holding up of shipments for this reason has hit the trade hard, and even yet things are pretty well disorganized in this respect, though within the last few days some neutrals have forbidden exports of tin plates and of canned foods, and this may possibly have the effect of causing a modification of the British export restrictions in their most onerous phases.

The following figures show approximately the prices ruling at different periods in 1914, of representative descriptions of iron and steel:

	January 1	March 1	June 1	September 1	December 1
	£ s d	£ s d	£ s d	£ s d	£ s d
No. 3 Cleveland pig iron, f.o.b.	50 6 (\$12.29)	50 9 (\$12.35)	51 3 (\$12.47)	51 6 (\$12.53)	52 3 (\$12.72)
East Coast hematite, f.o.b.	61 6 (\$14.96)	62 (\$15.09)	61 3 (\$14.90)	70 (\$17.03)	67 6 (\$16.42)
East Coast steel bars, f.o.b.	6 (\$29.20)	6 (\$29.20)	5 17 6 (\$28.59)	7 2 6 (\$34.67)	6 17 6 (\$33.46)
East Coast steel angles, f.o.b.	5 10 (\$26.76)	5 10 (\$26.76)	5 7 6 (\$26.15)	6 15 (\$32.83)	6 7 6 (\$31.02)
East Coast steel joints, f.o.b.	5 10 (\$26.76)	5 10 (\$26.76)	5 10 (\$26.76)	7 2 6 (\$34.67)	6 5 (\$30.42)
East Coast steel rails, f.o.b.	6 5 (\$30.42)	6 7 6 (\$31.02)	6 10 (\$31.63)	8 15 (\$32.85)	6 2 6 (\$29.81)
Scotch Siemens bars, f.o.b.	6 (\$29.20)	6 (\$29.20)	5 17 6 (\$28.59)	7 2 6 (\$34.67)	7 (\$34.06)
Scotch Siemens angles, f.o.b.	5 10 (\$26.76)	5 10 (\$26.76)	5 7 6 (\$26.15)	6 12 6 (\$32.24)	6 10 (\$31.63)
Scotch Siemens shipplates, f.o.b.	6 5 (\$30.42)	6 5 (\$30.42)	5 15 (\$27.98)	6 15 (\$32.85)	6 15 (\$32.85)
Launce. Crown Lion bars, f.o.b.	7 5 (\$35.28)	7 5 (\$35.28)	7 (\$34.06)	8 5 (\$40.15)	7 15 (\$37.71)
Launce. 2nd grade bar, f.o.b.	6 15 (\$32.65)	6 12 6 (\$32.24)	6 5 (\$30.42)	7 15 (\$37.71)	6 15 (\$32.65)
Staff'd, marked bars, f.o.b.	9 (\$43.79)	8 10 (\$41.36)	8 10 (\$41.36)	9 (\$43.79)	9 (\$43.79)
Staff'd, common bars	6 17 6 (\$33.46)	6 12 6 (\$32.24)	6 10 (\$31.63)	7 15 (\$37.71)	7 5 (\$35.28)
Galvanized sheets, f.o.b. 24"	11 15 (\$67.18)	11 2 6 (\$54.14)	10 15 (\$52.31)	15 (\$72.99)	11 5 (\$54.75)
Tin plates, 14 X 20, f.o.b.	12 9 (\$3.10)	13 3 (\$3.22)	12 4 1/2 (\$3.01)	13 3 (\$3.22)	11 6 (\$2.80)

Sharp Decline in Iron-Ore Production

The total quantity of iron ore mined in the United States in 1914 is estimated as between 41,000,000 and 42,500,000 gross tons, and the quantity shipped to receiving ports and blast furnaces between 39,500,000 and 41,000,000 tons. These figures are given out by the United States Geological Survey and are derived from data received by Ernest F. Burchard from 52 of the important iron-mining companies, which represent the principal iron-producing districts and whose combined output in 1913 was more than 90 per cent. of the total tonnage of iron ore mined in that year, estimates having been made for the output of the other companies. In 1913 there were 61,980,437 gross tons mined and 59,643,098 tons shipped. The 1914 returns therefore show a decrease in quantity of ore mined and shipped of about 33 per cent. from the tonnage of 1913.

Opportunities for the Foundry Engineer*

Slow Improvement in Methods Should Give Way
to Active Scientific Solving of Problems Making
Foundry Production More Certain and Economical

BY W. F. PRINCE, M. E.†

The day has come when the foundry must go forward. Those in power have taken it in hand. They know the foundry needs help and the possibilities are so great that the outsider is coming in. This outsider will be known as the foundry engineer.

Take the cupola to start with. Thirty years ago I worked on the cupola and if I could have that same old cupola today, I could do with it as good melting as is done today. Outside of the location or shape of tuyeres it is the same, and I believe I am wrong when I include the shape of tuyeres, as in those days they used shapes of all kinds. Can it be possible, that so many years ago when the first cupola was built, they were fortunate enough to strike the ideal design? I have made some experiments in melting and I would like to describe one of them to show what proper combustion located at the proper place means.

I was experimenting with a furnace of 24 in. inside diameter. In the inside was an opening to allow an oil flame to do the melting. In order to know how hot a flame I could get, I placed a 1-in. wrought-iron rod in the center of the furnace. As I would turn on my air or oil, I could see the different colors on the rod. I found when I got that rod to a certain white heat it would stay there until, by turning the air valve or oil valve the slightest turn, I could in one second start the rod to melting; by a slight turn I could check its melting; with slightly too much, or too little air, I could change it; as I could also, by moving the rod to a different position or by placing a piece of coke in the path of the flame. In fact, the slightest change would alter conditions from good to poor. The question it brought home to me was: "Can it be possible that hundreds of years ago they struck the right principle in melting, one which allows us to have obstructions of all kinds in our cupolas, leaky pipes, slipping belts and clogged tuyeres? It seems to me that while we can melt, and do melt, under such conditions, we do it at the cost of a large factor of safety, and I believe here is a chance for the scientific engineer to achieve advancement.

THE RE-BONDING OF MOLDING SAND

The life and worth of our molding sands depend largely on alumina, which I find to vary from 1 per cent. to about 12 per cent. Is it too much to imagine that some day someone will find a way to treat our sands and give to us a standard amount of alumina? Each year thousands of tons of molding sand is thrown away because it is old; we say it is burned out and has lost its bond. Sometimes this is so, but in many cases I find it is not. An analysis will show that the alumina and in some cases the vegetable bond is not gone, but the sand has taken on a coating or film of carbon which encircles or encrusts each grain of silica.

The principle of a bond is similar to that of the plastering of mud or loam to a brick. The pores of the brick absorb the moisture and draw in a

thousand little hairs of mud or loam. These small hairs of mud harden and form the bond. So, with our molding sands, they must have clean surfaces to allow this absorption to take place. This cannot take place as long as a film of carbon encrusts the grain of silica. Does it seem impossible to find a solution to dissolve or loosen up this carbon, to find a bond that will adhere to it, or find a way to grind off or scour or wash off the carbon? I have made some experiments along this line and I find that so-called old sand, if put into a pan mill and ground with sharp sand or fine rock will, to a certain degree, be restored.

I once received a carload of Millville gravel, and in unloading it with a belt conveyor found a lot of small white stones about the size of a marble. I took some of these and put them into a mill, crushed them to a powder and to them added about three times the same quantity of old, burned sand from the cleaning room. I ground them all together and put in water enough to make a mud. I then took a sample of this mud and without any other bond of any kind made a core as hard as a rock. The sharp, fine rock ground and cleaned my sand and the water and finer particles made a bond and the absorption took place and formed a bond. It was not a paying investment, but should our so-called molding sands give out, I believe a way will be found to use our old sands.

SEGREGATING SULPHUR AND ITS REMOVAL

The question of bad castings is one that interests us all, and we should grasp at every straw that gives promise of reducing loss. My mind goes back some thirty years and I am compelled to say that my foundry losses are greater than were those of my father. What have we done to stop them, who has found a way to overcome loss, and should one of us find a way and present it to the foundry world, how long must it exist in a state of coma before it is accepted? I will speak of a process in which I have been interested and which seems to me to have some merit, or did seem to until I tried to interest my fellow foundrymen. Since then, I, too, am beginning to think there must be something wrong with the process or with myself.

One day a piece of iron which showed a lot of kish was brought to me. It was a piece of water pipe, made in loam, and cast on the end. Analysis showed it to be high in sulphur. I drilled a hole in the clean iron just under the bad spot and found it to be low in sulphur—only 0.02. I believed the boiling of the mold collected the sulphur and drew it up to the bad spot; so I took a ladle and put a hole in the bottom, connected it with an air hose, turned on my air and then tapped my iron into the ladle. I boiled the iron for about ten minutes and on the top of the ladle found a lot of kish which I skimmed off, and on analyzing my metal found I had taken out about 35 per cent. of the sulphur. I have made hundreds of tests and I find I can at will take out from 25 to 50 per cent. of the sulphur. The oxygen in contact with the manganese creates an oxide and this rises, the affinity between it and the

*From a paper read before the Philadelphia Foundrymen's Association, January 6, 1915.
†Consulting engineer, New York.

sulphur being so great that it draws the sulphur and drags it to the top where it may be skimmed off. It seems to me, regardless of the fact that I made this discovery, that the trade at large should do everything possible to find out its true value for the protection and good of the foundry business.

I found sulphur causes troubles that I did not know of until I became interested in this process. I cast a large condenser and the top flange showed the kish and shrinkage which we all have seen and laid to a thousand and one causes. On analyzing the top flange, I found it to contain sulphur .196. On analyzing the bottom flange, I found it to contain sulphur .084. The process referred to had gone on in the mold. Dropping the iron from the top had caused agitation and the action which brought the sulphur to the top. Spongy castings and hard castings, from seemingly soft mixtures, are caused by this agitation that robs the sulphur from one spot and delivers it to another.

THE PROPER BONDING OF CORES

There is a principle involved in the bonding and baking of core sands, which, in my opinion but few know or take advantage of, although in order to do good work it should be understood and utilized. Core sand is held together by a vegetable bond, and we should use as little bonding material as possible on account of the gases it creates. The gases, if care is not taken, will pass up through the metal, agitate it and cause the sulphur process to start its action. Many castings have changed their nature through this process. The bonding of sand with a vegetable bond is a case of absorption and carbonizing the films of bond to give the required strength. If too much bond is used it does not carbonize, but retains a soft pasty nature and does not give strength unless an excessive amount of heat is applied.

Securing the right sand, the right bond, the right amount of bond and the right temperature in our ovens, is a field for the scientific engineer to cultivate and when this is done we can readily see what it will mean to the foundry. We make good cores at the present time, we seem satisfied, but it is at the cost of a high factor of safety in production and I believe one of the chief reasons for the loss of castings comes from our not living up to the principles involved in correct core-making. In visiting foundries I find that bonds of many kinds are used in all kinds of proportions, and fires vary greatly in temperature, and in but few cases are there means of taking temperatures. All of this, sooner or later, must come before the engineer who will see the necessity of a standard and work one out for us.

SOME PROBLEMS IN MELTING BRASS

[Turning his attention to brass and composition mixtures, Mr. Prince said his experience and study led him to believe that there is vast progress yet to be made in their manipulation. To serve the purpose of illustration, he cited the standard composition commonly designated as "government," containing copper, 88 parts; tin, 10 parts, and zinc, 2 parts, and commented as below.]

Here again we must stop and wonder if it is possible that in the ancient days, with crude methods of melting and casting, the right combination was found to cover all the conditions of poor melting, good melting, poor molding and good molding.

The combining of two or more metals we may call a soldering proposition. The tin, the zinc, the lead and the copper are as individual in the casting as in the metal pile. The combination which takes

place is not a chemical one, but the bonding together of each metal, and it is for this reason that the softer metals are used to form a solder or alloy which encrusts or encircles the copper and forms the bond. Does it seem possible that the right amount of this "solder" may be obtained from ten parts of tin and two parts of zinc under any and all of the conditions found in average brass furnaces?

To prove that conditions do change the combination, I will give a few cases where I have seen the results. With the "government" mixture we are frequently called on to furnish physical tests. Temperature plays a very important part in the combination. I have found test bars, cast side by side, on a casting yet having great physical variances, while the chemical analysis of each showed the same.

I once made a casting, 14-in. in diameter and 10-ft. long with a thickness of 3-in. It was cast in dry sand, and on the end. On this piece I cast 16 test-bars at different locations and I found the physical results varied from 5 per cent. elongation to 16 per cent. elongation. A test-bar taken out of the riser at the very top of the casting showed the best elongation. On a large cylinder, weighing some 5 tons, were cast 12 bars and each bar showed that the specifications were not met, but a section cut out of the casting gave 21 per cent. elongation, while the test bars did not give an average of over 10 per cent. Again, a flat plate 1 in. thick, 12 in. long and 6 in. wide, was cast in a dry sand mold, then cut into four strips and tested. These four bars, out of the same metal and the same plate, showed different variations, as follows:

Variations in Tests of One Cast

	Tensile strength, lb.	Elongation
No. 1 bar.....	33,150	10 per cent.
No. 2 bar.....	22,350	11½ per cent.
No. 3 bar.....	34,700	15 per cent.
No. 4 bar.....	38,200	15 per cent.

This same metal, out of the same ladle, cast into a solid block 6 x 6 x 12 in., with a test-bar cast on each side showed a variation of from 4½ per cent. elongation to 9½ per cent. elongation, and this same metal cast into a test-bar alone, in a flask, showed a tensile strength of 33,700 lb. with an elongation of 16 per cent.

TESTS NOT ALWAYS A TRUE INDEX

Hundreds of such tests convince me that meeting specifications requires more thought in locating test bars and the style of the test bar than does the mixture. I believe thousands of tons of castings have been condemned on the failure of the test bars. The test bars did not represent the physical conditions of the castings, and I believe castings show the same conditions as do test bars, should we cut them up and use different sections for tests.

Here we can see a life-long study for the scientific student. The engineer will find equally as many problems to solve in diagnosing and operating foundry machinery as he will in a machine shop or factory. Machinery must do the work now done by muscle. Man's physical strength cannot keep pace with advancement. I believe the day is coming when sand will be elevated to a given height and dropped in a cartridge form into a flask, and the speed of such molding will depend on the rapidity with which we can drop a cubic foot of sand and get the mold away. This is not a dream. I have elevated sand to a height of 50 ft., compressing it into a 12-in. cube, just enough to hold it together, and found that when dropped it strikes a blow of about 40 lb. per sq. in. and will ram a mold perfectly. The castings which came from such a mold were perfect. The speed of such molding will depend on

the ability of our foundry engineer to equip and to take care of the material used and the output.

DEVELOPMENT OF PERMANENT MOLDS

I want to say, as a practical foundryman, that I believe the making of castings in a permanent mold has merit, that there is a field for its use, and if we all would throw off the conservatism which we seem to be heir to and lend to this process our assistance, we could find a great use for it.

Some of us say it combines the carbon, that it cuts out in constant use, and that it has other draw-

backs. I say, sulphur combines carbon and that I can take a part of this sulphur out of iron, also a part of the manganese. This, then, is one step toward improving the conditions. Does it seem impossible for us to find a way to overcome some of its other seeming objections? I have used one of these machines, have made a study of the principle involved, and can see a future for such molding. It is going through the period all improvements have to go through. It has required years to convince us of the value of some machines. The first molding machine on the market was sold to an outsider.

Much More Merchant Ore from Lake Mines

The Situation Resulting from the Cancellation of the Great Northern Lease—Other Changes of the Past Year

—BY DWIGHT E. WOODBRIDGE—

Developments of the United States Steel Corporation, the Great Northern Ore Properties, and the Cuyuna range have been most in the mind of Lake Superior iron-ore interests for the past year. The ore trade has been so dead and the price of ore so low that operators have had as little as possible to say about either.

HILL PROPERTIES THAT CAN SHIP IN 1915

Without awaiting the official date of cancellation of the Great Northern lease, the Steel Corporation immediately at the close of the shipping season of 1914 transferred back to the Great Northern trust most of the properties which it has been holding since 1907, with the exception of those undeveloped lands that had been turned back when the formal notice of cancellation was made, two years or more ago. The properties so transferred at the close of the season were the underground mines, Mississippi, Leonard, Harold, North Uno, and the Dale, an open pit mine. On January 1, 1915, there were transferred the leases on South Uno, North Uno open pit, Leonard open pit and Fay. All these are open pit mines. At this time, therefore, all the Great Northern properties have been turned back to the Great Northern trustees, and are now being handled by them or by lessees from them. The Arthur Iron Mining Company, which is the operating concern for the trustees, is now actively at work in the Mississippi, Leonard underground, Harold, North Uno and Dale underground. It is also working at Thorne mine, which is situated near the village of Buhl, where shaft sinking is in progress. At Hill Annex, on the western Mesaba, shaft sinking and the driving of drainage drifts have been completed and a contract has been given A. Guthrie & Co., involving the stripping of 8,500,000 yards of overburden. It will be some years before this mine will be in position to make heavy shipments of ore. Buildings have been erected and stripping begun with three large shovels, one of which is a Marion No. 110, the heaviest type of steam shovel used in the Mesaba region. For more than two years the Arthur Iron Mining Company has been developing Dunwoody, a large open pit mine near Chisholm; Smith, a smaller property near Hibbing, and Dean near Buhl. These three mines required the stripping of about 13,000,000 cu. yd. and considerably more than one-half of this material has been removed. At Smith stripping operations have been completed and the mine is in

readiness for shipments in 1915. Some 5,000,000 yd. have been taken from Dunwoody and 3,000,000 yd. from Dean. Both these mines are in readiness to begin shipment, and the latter has been leased to the Tod-Stambaugh Company. This latter concern has also leased the e ½ of the sw ¼ of section 11, 57-21, near Hibbing, known heretofore as the Eddy property, and will develop it for early mining. Properties in section 31, 57-22, and in 6, 56-22 have been leased by Butler Brothers, stripping contractors, who will prepare them for mining on their own account.

The Arthur Iron Mining Company, therefore, is prepared to mine from no less than six open pit and from six underground mines whenever the state of the trade requires. It may be said in passing that few of these mines are of better than ordinary present-day Mesaba quality, and that their ore will probably average about the same as shipments from the Mesaba range for the past year, if one excepts the tonnage taken from a few high grade and exceptional deposits. Shipments by the Steel Corporation from the Great Northern mines which it has operated since 1907 have averaged a little better than 58 per cent. iron, dry, and it will be contrary to the experience of the district if such a grade can be maintained indefinitely. What total shipments for 1915 may be from these mines will be ascertainable only when the conditions of the iron trade for the year shall have been far more assured than they are to-day.

STEEL CORPORATION ORES TO REPLACE THE HILL

Having in view, doubtless, the early transfer of all these Great Northern properties, the Steel Corporation has been putting its mining affairs in the most effective physical condition, both by the opening of new properties and by the readjustment of leases, etc. Half a dozen underground mines have been developed—not enough to make up for the loss occasioned by the withdrawal of mines from which nearly 6,500,000 tons were taken in the past season, but there are several new open pit properties as well. The great bulk of the tonnage to be taken to replace that which has been lost will be from leases already in operation—Hull-Rust, Burt, Alpena, perhaps Stevens, which has been ready for many years to produce a large tonnage but has not been called upon as yet, and many more. Several of these mines produce a quality of ore better than

the present average of Mesaba range shipments. The Steel Corporation has readjusted many of its leases, so that they are now in reality fee properties, although the purchase price is based on the former royalty rate multiplied by the tonnage that complete exploration has discovered to exist therein. This price has been divided into as many annual payments as there are years of the leasehold, and cash or its equivalent has been paid for the years' payments up to the present, while future payments are the same as would be paid in royalties were the property to be exhausted at an even annual rate during the entire life of the leasehold period. Many properties have been placed under this plan during the past year or two, notably the Stevens, Higgins, and Chemung. While this plan compels the corporation to pay for much ore that it has not yet mined and that it cannot mine for some time to come, it has averted considerable friction and so arranges its payments that they are more uniform and regular than under the former regime. So far as is known, the Steel Corporation has little newly owned ore to replace that which it has surrendered to the Great Northern trustees; but its reserves are ample for many years to come, and any new properties which it may have taken are doubtless at far lower royalty rates than those which would now be the rule under the Great Northern leases.

CUYUNA AND MENOMINEE DEVELOPMENTS

Shipments from the Cuyuna district for the year have been close to a million tons; some of it good, more of it fair, and some of it quite indifferent. Cuyuna operators have found the year a difficult one, and changes and readjustments are liable to take place there in the near future. Royalty rates became excessive and in some cases have been based more on what could be screwed out of consumers in need of more adequate reserves than on the intrinsic merits of the situation. Explorations on the Cuyuna has been a particularly slow and groping process, and the richest ore deposit known today to exist on the range is on a 40-acre tract that was carefully but improperly drilled three times. It was not until a fourth exploration campaign was undertaken there that the existence of marketable ore was made known, although all preceding campaigns put some holes through the same ore that is now being opened. With this fact in mind, together with others like it, one may readily concede that the Cuyuna presents possibilities that have not yet been reached.

Explorations on the Menominee range have continued with some success, and the development of mines previously discovered has been carried forward more or less steadily. The region still presents certain fields for discovery that have not been entirely exhausted, though this is chiefly by reason of the fact that its ores lie deep and are somewhat elusive. Otherwise long before it would have been completely brought to light. Elsewhere in the Lake Superior region there is little to say as to ore finds. For the first time in some years the winter passes with no active exploratory work on the Vermillion range.

PROGRESS IN CONCENTRATION

There are indications that the business of concentrating iron ores of the Lake Superior region is reaching a broader basis than the mere washing of sandy Mesaba or the partial drying of too wet ores. Several additional washeries are to be installed on the Mesaba range, and it is now recognized that ores can be washed which up to a short time ago seemed not amenable to the process. Magnetic concentration has not yet become a fact, though its pos-

sibilities are appreciated in some quarters and there is good reason for expecting important developments in that direction before very long. The calcining of siderite at the works of the Lake Superior Corporation and the sintering of fines there by the Dwight-Lloyd process are established facts. Experiments are under way in an attempt to improve the manganese iron ores of the Cuyuna, ores that in their natural state are too poor either for manganese or for iron, and these seem to promise some result. If successful such a development would be of incalculable benefit to the district.

The year opens with large stocks of ore at furnaces and on lower lake docks, with little demand for them, with mines able to supply more than has ever been called for and far more than 1915 seems likely to require, with the burden of taxation and local government at all iron region towns far too great and growing rather than diminishing, and with the general labor market in a most demoralized condition.

Manganese Ore and Steel Trade of India

India now takes the first place among manganese-producing countries, according to an article in the Indian Trade Journal, published by the Commercial Intelligence Department of the government of India. Manganese ore exported in the fiscal year of 1913-1914 amounted to 718,049 tons of which Great Britain took 258,776 tons; Belgium, 187,821 tons; the United States, 106,327 tons and France, 103,847 tons. Exports of iron and steel totaled 84,855 tons, a decrease of nearly 20,000 tons from the previous fiscal year.

The pig-iron production of the Tata Iron & Steel Company was 140,293 tons in 1913 as against 97,367 tons in 1912 while 15,003 tons of steel rails and 16,044 tons of beams, channels and bars were made by the company in 1913. The Bengal Iron Works also produced 59,379 tons of beams, channels, etc.

Imports of iron and steel, other than for railroads, in the fiscal year of 1913-1914 amounted to 1,016,000 tons having a value of about \$50,000,000, an increase of 293,924 tons over the preceding fiscal year. The United Kingdom contributed 607,146 tons of this total and Germany 200,103 tons.

Machinery and mill work imported into India in 1913-14 was valued at about \$25,000,000, an increase of 43 per cent over the previous year's figures. Of railroad plant and rolling stock India imported about \$45,000,000 worth, the great bulk of it coming from Great Britain. Germany furnished about \$1,000,000 worth.

B. R. Shover, formerly general superintendent of the open-hearth steel plant of the Brier Hill Steel Company, Youngstown, Ohio, who is now general manager of the plant of the Tata Iron & Steel Company at Sakchi, India, states in correspondence with Youngstown friends that he found conditions there very satisfactory. The company is prospering. Its property is being more fully explored. Deposits of magnesite and chromite have been found, possibly in sufficient quantities to allow the company to make magnesite brick for its open-hearth furnaces, which would result in a considerable saving. The construction has been started of 50 Koppers by-product coke ovens, which are being built so that 50 can be added later. The company's present coke plant is of the non-recovery type.

The Canton Foundry Machine Company, Canton, Ohio, is adding three new sizes to its line of alligator shears. One is a quick-acting clipping shear with double flywheels, but without gears, and mounted on leg standards; it weighs 3000 lb. and has capacity for shearing bars up to 1 in. square. The other two machines are double geared and in larger sizes than have heretofore been made by the company, the No. 6 weighing 38,000 lb., having a capacity for shearing bars up to 3½ in. square, and the No. 7, weighing 60,000 lb. and having a capacity for shearing bars up to 4 in. square.

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EDITORS:

A. I. FINDLEY

GEO. W. COPE

W. W. MACON

CHARLES S. BAUR, *Advertising Manager*

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The Renovation of Business

One of the steel manufacturers who wrote of the possibilities of the Federal Trade Commission in *The Iron Age* of January 7 said that "a vast change has come over the spirit of business in this country within the past decade." He added that without Government regulation manufacturers could be depended upon to recognize their obligation to the people and to serve them faithfully, while at the same time making full use of opportunities for constructive development. There is a good deal worth thinking about in these statements. By whatever name known—whether we call it business conscience or sense of responsibility or appreciation of obligation—there can be no denying "the change that has come over the spirit of business." No one who has talked with any considerable number of industrial leaders in recent years so as really to know their minds or has had knowledge of the practice of important corporations—in the steel trade, for example—could fail to be impressed with the extent of the adjustment of business to the dictates of enlightened public opinion. It is not an unwilling compliance with regulations imposed from without that we see, but active cooperation in the carrying out of laws and frequently the initiation of policies going beyond the law's demands.

With the abolition of railroad rebates have gone other preferential arrangements whose elimination has made trade fairer. With the passage of compensation and inspection laws have come also liberal pension systems, anti-accident measures and the provision of employees' benefits beyond anything known in the regime of 15 and 20 years ago. Instead of interlacing corporations in which the control of a small group has given it inordinate advantages at the expense of the general body of stockholders, there has come the safeguarding of varying interests, many times to the extent of fairness leaning over backward. It has not been uncommon in steel companies for salesmen to be handicapped in getting a contract from a company in which some of their own directors were interested.

It happened more than once in the trying of the Steel Corporation suit that officers of the corporation were confronted with records of action taken early in its history that represented a lower plane of business ethics than the practice of the same officers in more recent years. Hostile counsel pressed for an explanation that would be tantamount to an admission, but got only this: "Perhaps we have learned to be better directors than we were in the beginning." The answer may well stand for what

has happened in the same interval in many companies.

The trouble with some of the campaigners who would keep up the war on business is that they know little of the extent to which it has been reformed without the law. They are not unlike the labor leaders who demand the control of open shops in the interest of the workmen, when the latter may oftentimes have better conditions than the unions and their militancy have been able to secure.

End of the Danbury Case

A decision, which is to be hoped is final, was handed down by the Supreme Court of the United States January 5, in the famous suit known as the Danbury case. In this suit, which was instituted in 1903, D. L. Loewe & Co., Danbury, Conn., manufacturers of hats, demanded triple damages under the Sherman anti-trust law from a large number of members of the United Hatters' Union, who were charged with having boycotted the Loewe hats as a result of a strike at the firm's factory in 1902. This suit has been decided and appealed so frequently that it will undoubtedly rank among celebrated cases in the history of jurisprudence.

In its first appearance before the Supreme Court, the question at issue was whether labor unions were subject to the Sherman anti-trust law and the court so decided. For this reason the suit has been most hotly contested by the representatives of organized labor. On the other hand, it has been as resolutely prosecuted by the plaintiffs, who were backed in their contentions by other manufacturers who desired the important question of damages for boycotting to be definitely solved and if possible to have it solved in favor of the rights of employers.

The developments in this case, in the course of its progress through the courts, were perhaps chiefly responsible for the efforts of the American Federation of Labor to have a declaration that labor unions were to be permitted to institute boycotts for the purpose of winning a strike read into the statutes of the United States. They were quite confident of being able to accomplish this when the Clayton anti-trust bill was on its passage through Congress. The impression has prevailed in some quarters that a judicial decision, even from the Supreme Court, adverse to union labor would not be of special significance in view of the reference to union rights in the Clayton bill as enacted. It is claimed, however, by good legal opinion that this act gives the unions no new rights and does not excuse their

members from responsibility for the acts of their unions in which they have acquiesced. If this proves to be the case, should the Clayton act be brought up for judicial interpretation, it will be a most important matter, as it will definitely indicate that the unions have again been defeated in their efforts to secure special privileges. The decision of the Supreme Court says, in part:

We agree with the Circuit Court of Appeals that a combination and conspiracy forbidden by the statute were proved and that the question is now narrowed to the responsibility of the defendants for what was done by the sanction and procurement of the societies above named.

It is a tax upon credulity to ask any one to believe that members of labor unions of that kind did not know that the primary and secondary boycott and the use of "we don't patronize" or the "unfair" list were expected to be employed in the effort to unionize these shops. The jury could not but find that by the usage of the unions the acts complained of were authorized and authorized without regard to their interference with commerce among the States.

The decision, as the case now stands, would seem to make boycotting, as a means of winning a strike, unpopular with unions having among their members men of some property. The American Federation of Labor has been active in promoting this species of warfare as a plan most likely to be effective, especially if the employers interested were manufacturers of products of widespread use, or of products used by other manufacturers whose workmen were organized. The language of the decision is so plain as completely to sweep aside the sophistical declarations of union leaders.

Progress in Electric Steel

The rapid strides made by the United States in the installation of electric furnaces for producing steel, as indicated by the review published in *The Iron Age* of January 7, are a surprise to the average man in the industry. In 1909 there were but two such furnaces in this country; a year later, 10; in 1913 the number had grown to 19, and now it is 41. Outside of the United States there were 63 electric steel furnaces in 1909, 104 in 1910, 121 in 1913, and at present 172, practically all in Europe.

Two facts are emphasized by these figures: That the electric furnace for making steel is not only far beyond the experimental stage, but has entered the commercial field as a decidedly important factor; also, that while this country in the early stages of the development lagged behind, it now ranks second among the nations in the number of electric furnaces in the steel industry. In 1909 it was at the foot of the list and in 1913 third in rank, Germany being first from the beginning. The by-product coke oven and the blast-furnace gas engine had a like history—extensive development in Europe with very slow adoption in this country of the fruits of Europe's experience.

While operations in this country have been largely in the production of steel castings, the electric furnace showing decided adaptability to the making of high grade and intricate small castings for automobile and other work, its use is clearly broadening in the refining of Bessemer and open-hearth metal, as well as the production of the higher grades of alloy and other special steels. Out of the 41 American installations 22 are for the production of steel

castings, whereas in European countries, particularly Germany, the largest use has been in the production of tool and other special steels. It is now recognized among metallurgists that steel made in an electric furnace, where any degree of refining is necessary and where considerations of composition are the same, is superior in static and dynamic properties to steel made by any other process.

As to the two general types of current employed, it is to be noted that on January 1, 1915, the number of arc furnaces was about five times that of induction furnaces, while in 1913 and 1910 the ratio was two to one in favor of the arc furnace. At present in this country there are about six times as many arc as induction furnaces.

The future of electrically made steel in the United States is full of promise. The war has cut down greatly the production of special steels in Europe and producers in this country are now called on to furnish steels formerly obtained abroad. This demand is being gradually met now with steels from electric and other furnaces, the product being fully equal to any heretofore obtained from Europe.

It is worthy of note that most of the more recent advance of the electric furnace in this country is from within the steel industry and not from without, and is the result of competitive effort to improve quality.

The Iron and Other Industries in 1914

That the iron trade is subject to wider fluctuations in activity than occur in many other important industries can be illustrated by comparisons of production. Through preliminary reports made by the Geological Survey data sufficiently accurate for such comparative purposes are available as to production in 1914 of coal, petroleum and cement.

The production of pig iron in 1914 was approximately 23,300,000 gross tons. This was smaller than the output in any of the five preceding years, and fell short of the record production, made in 1913, by 25 per cent.

The production of coal in 1914 was about 510,000,000 net tons, this being smaller than the production in the two preceding years only, and representing a decrease from 1913 of only 10 per cent.

The production of petroleum in 1914 was about 292,000,000 barrels of 42 gallons, this being a new record, and passing the previous record, made in 1913, by 18 per cent.

The production of Portland cement in 1914 was about 88,514,000 barrels of 380 pounds, this being smaller than the production in one preceding year only, 1913, and falling short of the production in that year by only 4 per cent.

That coal production should receive only a relatively slight setback in a year that was "off" industrially is not particularly unnatural, seeing that so large a proportion of the coal is used for heating purposes, and the consumption in this direction would fall off but little unless the times were very hard indeed. The industrial use of coal does not vary in full measure with the degree of industrial activity, as industrial plants must be heated and steam kept up, to an extent, so long as there is any production at all. The railroad consumption, too, does not vary as greatly as the volume of freight movement.

The production of petroleum varies in part according to fortuitous circumstances, as men chance to connect up with nature in tapping the earth; yet no one can deny that it was a spectacular performance, in an off year industrially, and when for a time oil exports were practically shut off by reason of the war, for production to break the best previous record by nearly 18 per cent.

The Portland cement production in 1914 really reflects the conditions that affected the iron and steel industry more accurately than is the case with either coal or petroleum, for the reason that cement is a construction material rather than one of common everyday continuous consumption. That the 1914 production was smaller than that of only one year preceding, thus setting the industry back only a little over a year, while the iron and steel industry was set back six years, is due simply to the fact that in the nature of things the production of Portland cement has increased in a very remarkable manner, it being a commodity the value of which has come to be recognized very fully, but only in very recent years. Due to this rapid springing into popularity, until 1914 the industry did not have a single backset, each year establishing a new record. The production in 1895 was 990,324 barrels. In less than two years this was doubled; in six years it was multiplied by 12. Starting afresh with this new record, of 22,000,000 barrels made in 1903, there was a doubling in three years, by 1906 with 46,000,000 barrels, and a second doubling in the next seven years, with 92,000,000 barrels in 1913. With such a past, the cement industry received in 1914 as great a relative setback as did the iron industry.

Buffalo Chamber of Commerce on Industrial and Trade Development

The annual dinner of the Buffalo Chamber of Commerce held at the Ellicott Club Thursday evening, January 7, was made notable by the participation of a number of well-known iron and steel manufacturers and the presidents of a number of the railroads serving Buffalo. Frank B. Baird, president of the Buffalo Union Furnace Company, was toastmaster. E. A. S. Clarke, president of the Lackawanna Steel Company, responded to "Buffalo and the Buffalo Chamber of Commerce"; George A. Post, New York, president of the Railway Business Association, to "Business and Legislation"; President James A. Farrell, of the Steel Corporation, to "Work and Aims of the National Foreign Trade Council"; Congressman W. D. B. Ainey, of the Fourteenth District of Pennsylvania, to "Our Relations with Japan and the Far East"; Senator James W. Wadsworth, Jr., of New York, to "Western New York in National Affairs." Mr. Clarke gave some data showing the growth of Buffalo, and outlined the policy which in his view would set the city farther on in industrial development. Mr. Farrell told how the National Foreign Trade Council had been able to give direction to the efforts of American manufacturers in dealing with the foreign trade problems that have arisen in the past five months. He promised that from time to time the Council would raise its voice against any tendency that might cause reaction. He suggested that there must be early revision of present navigation laws if this country is to be successful in the establishment of an American merchant marine of sufficient tonnage to cope with the country's necessities. In conclusion he proposed the following sentiment as a slogan of the movement: "Foreign trade, being a vital element in domestic prosperity, concerns every citizen and should be fostered by governmental, commercial, industrial, transportation and financial co-operation under a national business policy designed to muster every resource."

British Ferromanganese Embargo Likely to Continue

WASHINGTON, D. C., January 12, 1915.—Late advices of the State Department indicate that the matter of the British embargo upon ferromanganese and manganese ore will receive no further consideration at the hands of the British Foreign Office until the broader question as to the treatment of American commerce by the British Navy has been satisfactorily settled. It will then be taken up by the Secretary of State as an independent proposition, but there is absolutely no information obtainable at this writing to indicate whether the department will succeed in its effort to have the embargo raised. Letters received here from importers and consumers of manganese indicate that an entirely erroneous impression has been created in their minds as the result of the publication of Secretary Bryan's note to the American ambassador at London with regard to British interference with American commerce. The writers of these letters appear to have gathered from the note that the State department is protesting against all forms of interference. As a matter of fact, the Secretary's protest deals solely with the seizure and detention of vessels carrying American cargoes, upon suspicion rather than upon evidence, or as the result of a vague fear that the goods in question may ultimately reach the enemy's country. The manganese embargo, however, is admitted by the State department to be wholly within the legal rights of the British Government, and the raising of it would be regarded as a gracious act, illustrating the friendly feeling of England for the United States. The ferromanganese and the manganese ores embargoed by the order the department is now seeking to have raised are the products of Great Britain, or her colonial possessions, and she has the same right to forbid their exportation to the United States that any nation has to restrict or prohibit shipments of products which are required at home or which, for domestic reasons, it is desired shall not be used elsewhere.

The British Embassy is following with very close attention the hearings before the Senate Committee on Foreign Relations upon the bills intended to prohibit the exportation of munitions of war or material capable of being used for military purposes, and there is reason to believe that, first, the question of the manganese embargo will not be determined until the fate of these bills is known, and, second, in the event of their defeat, it will prove a difficult task to bring about the lifting of the restricting order. The British Government is understood to take the position that, inasmuch as considerable quantities of manganese are used in the production of war material, an embargo thereon is fully justified so long as the possibility exists that such material may reach the enemy's ports.

The situation with respect to shipments of copper has improved substantially during the past few days and promises soon to be entirely normal, as the result of concessions made by Great Britain. Italy has indicated that the unusually large quantities of copper received from the United States are intended to take the place of the supply secured in Germany before the war and that the metal is intended solely for domestic use, no part of it being shipped to Germany or to any country at war with England. Information received at the State department indicates that Great Britain has accepted the Italian explanation. W. L. C.

The iron trade in Italy has been affected by the war less than was originally feared. Want of fuel has been the chief difficulty, but British and American coal has been obtainable as well as some from Germany recently. None of the plants has closed and prices have been well maintained despite efforts to raise them unduly. Prospects, however, are not brilliant.

Iron ore shipments from Norway via Narvik, which usually amount to 300,000 tons per month, have been reduced to about 50,000 tons per month since the outbreak of the war.

THE STEVENS PRICE-FIXING BILL

Argument in Its Favor at Washington as Helping the Smaller Dealer

WASHINGTON, D. C., January 12, 1915.—The advocates of the enactment of the so-called price-fixing bill, introduced in the House of Representatives at the last session by Representative Stevens, of New Hampshire, have succeeded in arousing much interest in the subject and predict with confidence that a measure covering substantially the ground of this bill will become a law in the near future. In response to many requests from national and local organizations of manufacturers, wholesalers and retailers the House Committee on Interstate and Foreign Commerce, before which the bill is pending, began a series of hearings on the measure January 9, which will continue at intervals until action is taken. The American Fair Trade League has been especially active in pushing the bill and to this end is utilizing an organization which was perfected a year ago for the purpose of urging legislation along the lines of the Stevens bill as a part of the programme for the amendment and extension of the anti-trust laws.

The chief provision of the Stevens bill makes it lawful for any manufacturer or dealer, making or selling goods under trademark or special brand, to prescribe "the sole uniform price" at which each article made or handled by him may be re-sold, subject to conditions substantially as follows: (a) such vendors shall not have any monopoly or control of the market for articles belonging to the same general class of merchandise; (b) they shall affix to each article sold a statement of the prescribed price; and (c) shall file in the Bureau of Corporations (or Federal Trade Commission) a statement setting forth the trademark or special brand owned or claimed in respect of such articles, paying a registration fee of \$10 for each filing. The bill further provides that the price to all buyers, under any contracts, shall be uniform and there shall be no discrimination in favor of any particular purchaser by allowance or discount for any cause, or by the payment of any rebate or commission. In the case of goods which are forced upon the market by business failures, etc., the bill provides that articles, the prices of which are fixed under the terms of the proposed law, may be sold at any obtainable price after due notice has been given the dealer from whom they were purchased, who, for a reasonable length of time, will have the option to repurchase such goods at the prices paid therefor.

THE BRANDEIS ARGUMENT FOR THE BILL

At the hearings before the House Committee on Interstate and Foreign Commerce this week Louis D. Brandeis, who has represented the Government in many proceedings brought under the anti-trust laws, and who has recently appeared as counsel for the Interstate Commerce Commission in resisting applications for increased freight rates, came out squarely for the Stevens bill. His statement aroused great interest in view of his general previous attitude in opposition to the business interests of the country. Mr. Brandeis declared that the decision of the Supreme Court, holding that contracts fixing re-sale prices were nonenforceable, was "an inadvertence," and played directly into the hands of monopoly, enabling it to crush the small dealer. The Supreme Court, he said, had failed to grasp the business significance of the principle underlying the fixing of re-sale prices and had rendered a decision which struck a blow at competition, the regulator of monopoly. Price cutting, he said, was monopoly's most effective weapon which, in many cases, had been used mercilessly. In criticising the decision, Mr. Brandeis pointed out that it was concurred in by only five of the nine justices and was contrary to the rulings of many other important tribunals. Massachusetts has found such contracts valid, as have also New York, Kentucky, California and Washington. The English courts, from the lowest to the highest, have held price-fixing to be valid, while Denmark has not

CONTENTS

Automobile Foundry Core-Room Economies.....	131
Device for Changing Rolling-Mill Rolls.....	133
Three Recently Developed Die Heads.....	134
Shaft and Forging Centering Machine.....	135
Motor-Driven Inverted Drilling Machine.....	135
A Stationary Boiler Stoker.....	136
A New Ball-Bearing Polishing Machine.....	137
New Arbor Press for Automobile Work.....	137
Chuck Company Reorganizes and Expands.....	137
Special Ball Bearing for Lighthouse.....	138
Cast-Steel Motor Truck Wheels.....	138
Record of a Cast-Steel Piston Rod.....	138
The Spacing Table in the Structural Shop.....	139
Scientific Management in the Office.....	142
The British Iron and Steel Trade in 1914.....	144
Sharp Decline in Iron Ore Production.....	145
Opportunities for the Foundry Engineer.....	146
Much More Merchant Ore from Lake Mines.....	148
Manganese Ore and Steel Trade in India.....	149
The Renovation of Business.....	150
End of the Danbury Case.....	150
Progress in Electric Steel.....	151
The Iron and Other Industries in 1914.....	151
Buffalo Chamber of Commerce on Industrial and Trade Development.....	152
British Ferromanganese Embargo Likely to Continue.....	152
The Stevens Price-Fixing Bill.....	153
The Iron and Metal Market.....	154
Grammes & Sons Establish Works Library.....	165
A Two and Four Cycle Gasoline Engine.....	165
An Engineering Foundation.....	165
The Canadian Steel Trade in 1914.....	166
British Steel Output, First Half of 1914.....	166
Record Exports of Zinc.....	166
German Iron and Metal Trades.....	166
German Pig Iron and Steel Output Increasing.....	166
Personal.....	167
American Erectors' Association Organized.....	167
Obituary.....	168
Special Machines Wanted.....	168
Locomotive and Car Construction in 1914.....	169
Coke Oven Accidents in 1913.....	169
United Steel Company Extensions.....	169
Philadelphia Foundrymen's Association.....	169
Pittsburgh and Nearby Districts.....	170
Newark Foundrymen's Association.....	170
Republic Iron & Steel Company Changes.....	170
Youngstown Sheet & Tube Company to Readjust.....	171
Large Increase in Steel Corporation Orders.....	171
Foreign Trade Convention.....	171
The Machinery Markets.....	172
Trade Publications.....	178

only upheld the principle, but has provided penalties for those who violate price-fixing contracts. Stress was laid on the course of Denmark as a country of small traders and farmers.

PRICE CUTTING HURTS SMALL DEALERS

As illustrating the practical effect of the court's decision, Mr. Brandeis declared that manufacturers with small capital were obliged to submit to the cutting of the price of their products by middlemen and retailers, while big concerns overcame the obstacle by the simple device of establishing branches. The Ford Motor Company, for example, rather than allow its cars to be sold by general dealers in automobiles, had established a branch in every important community with the result that it was not possible to purchase a new Ford car at less than list price anywhere in the world. The cost of establishing such branches would, of course, be prohibitory in all but a very large business, in which, however, it is not only practicable but highly profitable.

In discussing the equities of the Stevens bill, Mr. Brandeis said that the general tendency to consider the public and the consumer as synonymous terms gives rise to a popular misconception. The manufacturer and the grower with their armies of employees form a part of the public whose rights must be respected. In addition, the jobbers and middlemen, who frequently finance both manufacturer and retailer, must also be considered, and he declared the world had outgrown the haggling and bargaining of the days of barter and, as the coming of money partially standardized trade, so the fixing of re-sale prices would help remove the uncertainties of merchandising to-day. The committee will hear a dozen other witnesses at the next meeting, the date of which has not been fixed.

W. L. C.

The Iron and Metal Markets

FORTY TO FIFTY PER CENT

Present Operations of Steel Works

Rail Orders Come Out Slowly—An Advance in Wire Products

Steel works are increasing slightly their rate of operations, and for this week a number of large companies are running at 40 to 50 per cent. of capacity. The Steel Corporation's percentage is 45, and it may be able to increase this shortly to 50, as specifications are rather better.

Taking the trade through, the first half of January has brought no new turn. The railroads naturally require some time to canvass and finance their needs and have so indicated in response to intimations that early and very considerable buying was now expected from them.

Wage readjustments, affecting principally the highest paid men, are being made by a number of steel companies and are an inevitable result of the long depression and the low-priced business on which mills will be working for three months and probably longer.

Rail buying thus far and that in prospect give no assurance of more than partial employment for rail mills through the winter. One large system, in fact, aims to avoid January and February rollings because of suspected effects of extremely low temperatures.

It is not known how much of the 150,000 tons the Pennsylvania Railroad has definitely decided to buy will be given out this month. A conference with the rail companies this week is taking up variations from the last specifications. The New York Central has placed a part of the 40,000 tons on which it asked prices on January 4. The New Haven is to buy 18,000 tons and the Boston & Maine 15,000 tons. This week the Nashville, Chattanooga & St. Louis has placed 5000 tons at Ensley. Western roads have given little sign of their probable wants.

Thus far the Canadian rail mill at the Sault has booked 17,700 tons for shipment to this side, 8000 tons for the Pere Marquette, 6000 tons for the Grand Trunk for Michigan delivery, 1700 tons for the Big Four and 2000 tons additional for the New York Central. All are open-hearth rails, sold for the most part at \$25.50 at mill. Further amounts are under negotiation. Meantime this invasion has caused no small commotion in the rail trade.

Foreign rail business matures slowly—20,000 tons talked of for Russia and 27,000 tons for Portugal. German mills have cut deeply to get neutral business. After taking 27,000 tons in Norway at \$25.79, they have now captured 9000 tons in Denmark at \$26.16 delivered. Queensland has bought 20,000 tons from Great Britain and the new mill in New South Wales has been given a small order.

A vessel placed with an Eastern shipyard last week makes a total of nine ordered in the East within a month, requiring 40,000 to 45,000 tons of steel, and more are in prospect. High freights and the British government's use of so many vessels are paving the way for great activity at British yards.

Wire manufacturers, following the lead of plate, shape and bar mills, made an advance of \$1 a ton effective January 11, bringing nails to \$1.55 and

fence wire to \$1.35. Specifications had been lagging and contract periods had been stretched out from 60 days to 90 days.

The leading sheet interest is now quoting \$2 a ton above the extreme prices of December.

Bar mills look for some improvement in specifications from implement manufacturers who for some time have been running at little better than 50 per cent. of capacity. There is more inquiry also for reinforcing bars, indicating preparations for spring work.

Bars and structural shapes are holding the recent advance to 1.10c., Pittsburgh, but there is some flexibility in plates, 1.05c. being reported in close competition.

The old material market has developed more life than in months. At Pittsburgh heavy melting steel is much in demand and has advanced to \$11.75 under steady buying. At various centers, particularly Chicago, railroads have been marketing their stocks but all have been readily absorbed with no setback.

According to latest advices Great Britain is likely to adhere indefinitely to its policy of preventing exports of ferromanganese. With neither buying nor selling the American market drifts on unchanged, but higher prices seem likely.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type. Declines in Italics

At date, one week, one month, and one year previous.

Pig Iron, Per Gross Ton:	Jan. 13, 1915.	Jan. 6, 1915.	Dec. 16, 1914.	Jan. 14, 1914.
No. 2 X, Philadelphia...	\$14.25	\$14.25	\$14.25	\$14.50
No. 2, Valley furnace...	13.00	13.00	12.75	12.75
No. 2, Southern, Cin'ti...	12.40	12.40	12.40	14.00
No. 2, Birmingham, Ala.	9.50	9.50	9.50	10.75
No. 2, furnace, Chicago*	13.00	13.00	13.00	14.00
Basic, del'd, eastern Pa.	13.50	13.50	13.50	14.00
Basic, Valley furnace...	12.50	12.50	12.50	12.50
Bessemer, Pittsburgh...	14.55	14.70	14.70	14.90
Malleable Bess., Ch'go*	13.00	13.00	13.00	14.00
Gray forge, Pittsburgh...	13.45	13.45	13.40	13.65
L. S. charcoal, Chicago...	15.75	15.75	15.75	15.25

Billets, etc., Per Gross Ton:	19.00	19.00	19.00	20.00
Bess. billets, Pittsburgh...	19.00	19.00	19.00	20.00
O.-h. sheet bars, P'gh...	20.00	20.00	20.00	20.00
Forging billets, base, P'gh.	24.00	24.00	24.00	24.00
O.-h. billets, Phila.	21.40	21.40	21.40	21.50
Wire rods, Pittsburgh...	25.00	25.00	25.00	25.50

Old Material, Per Gross Ton:	11.25	11.25	11.00	13.00
Iron rails, Chicago.....	13.00	13.00	13.00	15.50
Iron rails, Philadelphia...	10.00	9.75	9.50	11.50
Carwheels, Chicago.....	11.00	11.00	10.00	12.00
Carwheels, Philadelphia...	11.75	11.50	10.75	11.00
Heavy steel scrap, P'gh.	10.00	10.00	9.50	10.00
Heavy steel scrap, Phila.	9.00	9.00	8.25	9.25
Heavy steel scrap, Ch'go.	11.25	11.25	10.50	10.75
No. 1 cast, Pittsburgh...	12.00	12.00	11.50	12.00
No. 1 cast, Philadelphia...	9.25	9.25	9.00	10.25

Finished Iron and Steel, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Bess. rails, heavy, at mill	1.25	1.25	1.25	1.25
Iron bars, Philadelphia...	1.17 1/2	1.17 1/2	1.17	1.20
Iron bars, Pittsburgh...	1.15	1.15	1.15	1.35
Iron bars, Chicago.....	0.97 1/2	0.97 1/2	0.95	1.12 1/2
Steel bars, Pittsburgh...	1.10	1.10	1.05	1.20
Steel bars, New York...	1.26	1.26	1.21	1.36
Tank plates, Pittsburgh...	1.10	1.10	1.05	1.20
Tank plates, New York...	1.26	1.26	1.21	1.36
Beams, etc., Pittsburgh...	1.10	1.10	1.05	1.20
Beams, etc., New York...	1.26	1.26	1.21	1.36
Skelp, grooved steel, P'gh	1.10	1.10	1.10	1.20
Skelp, sheared steel, P'gh	1.15	1.15	1.15	1.30
Steel hoops, Pittsburgh...	1.20	1.20	1.20	1.35

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Sheets, black, No. 28, P'gh.	1.80	1.80	1.80	1.85
Galv. sheets, No. 28, P'gh.	2.75	2.75	2.75	2.85
Wire nails, Pittsburgh...	1.55	1.50	1.50	1.55
Cut nails, Pittsburgh...	1.50	1.50	1.55	1.55
Fence wire, base, P'gh...	1.35	1.30	1.30	1.35
Barb wire, galv., P'gh...	1.05	1.90	1.90	1.95

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

Coke, Connellsville,

	Jan. 13, 1915.	Jan. 6, 1915.	Dec. 16, 1914.	Jan. 14, 1914.
Per Net Ton at Oven:	1915.	1915.	1914.	1914.
Furnace coke, prompt....	\$1.50	\$1.50	\$1.50	\$1.85
Furnace coke, future....	1.75	1.75	1.75	2.00
Foundry coke, prompt....	2.00	2.00	1.90	2.50
Foundry coke, future....	2.15	2.15	2.15	2.60

Metals.

Per Lb. to Large Buyers:	Cents.	Cents.	Cents.	Cents.
Lake copper, New York.	13.75	13.50	13.62½	14.50
Electrolytic copper, N. Y.	13.62½	13.00	13.37½	14.00
Spelter, St. Louis.....	5.90	5.60	5.65	5.10
Spelter, New York.....	6.05	5.75	5.80	5.25
Lead, St. Louis.....	3.50	3.60	3.67½	3.97½
Lead, New York.....	3.70	3.80	3.80	4.10
Tin, New York.....	33.35	33.25	34.75	36.70
Antimony, Hallett's, N. Y.	15.00	14.00	14.00	7.00
Tin plate, 100-lb. box, P'gh	\$3.10	\$3.10	\$3.10	\$3.40

Finished Iron and Steel f. o. b. Pittsburgh

Freight rates from Pittsburgh in carloads, per 100 lb.: New York, 16c.; Philadelphia, 15c.; Boston, 18c.; Buffalo, 11.6c.; Cleveland, 10.5c.; Cincinnati, 15.8c.; Indianapolis, 17.9c.; Chicago, 18.9c.; St. Louis, 23.6c.; Kansas City, 43.6c.; Omaha, 43.6c.; St. Paul, 32.9c.; Denver, 68.6c.; New Orleans, 30c.; Birmingham, Ala., 45c.; Pacific coast, 80c. on plates, structural shapes and sheets No. 11 and heavier; 85c. on sheets Nos. 12 to 16; 95c. on sheets No. 16 and lighter; 65c. on wrought pipe and boiler tubes. The foregoing rates to the Pacific coast are by rail. The rate via New York and the Panama Canal on plates, shapes, etc., is 46c.

Plates.—Tank plates, ¼ in. thick, 6¼ in. up to 100 in. wide, 1.10c., base, net cash, 30 days. Following are stipulations prescribed by manufacturers:

Rectangular plates, tank steel or conforming to manufacturer's standard specifications for structural steel dated February 6, 1903, or equivalent, ¼ in. and over on thinnest edge, 100 in. wide and under, down to but not including 6 in. wide, are base.

Plates up to 72 in. wide, inclusive, ordered 10.2 lb. per sq. ft., are considered ¼ in. plates. Plates over 72 in. wide must be ordered ¼ in. thick on edge, or not less than 11 lb. per sq. ft., to take base price. Plates over 72 in. wide ordered less than 11 lb. per sq. ft. down to the weight of 3-16 in. take the price of 3-16 in.

Allowable overweight, whether plates are ordered to gauge or weight, to be governed by the standard specifications of the Association of American Steel Manufacturers.

Extras	Cents per lb.
Gauges under ¼ in. to and including 3-16 in....	.10
Gauges under 3-16 in. to and including No. 8....	.15
Gauges under No. 8 to and including No. 9....	.25
Gauges under No. 9 to and including No. 10....	.30
Gauges under No. 10 to and including No. 12....	.40
Sketches (including straight taper plates), 3 ft. and over.....	.10
Complete circles 3 ft. in diameter and over.....	.20
Boiler and flange steel.....	.10
"A. B. M. A." and ordinary firebox steel.....	.20
Still bottom steel.....	.30
Marine steel.....	.40
Locomotive firebox steel.....	.50
Widths over 100 in. up to 110 in., inclusive.....	.05
Widths over 110 in. up to 115 in., inclusive.....	.10
Widths over 115 in. up to 120 in., inclusive.....	.15
Widths over 120 in. up to 125 in., inclusive.....	.25
Widths over 125 in. up to 130 in., inclusive.....	.50
Widths over 130 in.....	1.00
Cutting to lengths, under 3 ft. to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55

No charge for cutting rectangular plates to lengths 3 ft. and over.

Structural Material.—I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in. on one or both legs, ¼ in. thick and over, and zees, 3 in. and over, 1.10c. Extras on other shapes and sizes are as follows:

	Cents per lb.
I-beams over 15 in.....	.10
H-beams over 18 in.....	.10
Angles over 6 in., on one or both legs.....	.10
Angles, 3 in. on one or both legs, less than ¼ in. thick, as per steel bar card, Sept. 1, 1909.....	.70
Tees, structural sizes (except elevator, handrail, car truck and conductor rail).....	.05
Channels and tees, under 3 in. wide, as per steel bar card, Sept. 1, 1909.....	.20 to .80
Deck beams and bulb angles.....	.30
Handrail tees.....	.75
Cutting to lengths, under 3 ft. to 2 ft. inclusive.....	.25
Cutting to lengths, under 2 ft. to 1 ft. inclusive.....	.50
Cutting to lengths, under 1 ft.....	1.55

No charge for cutting to lengths 3 ft. and over.

Wire Products.—Fence wire, Nos. 0 to 9, per 100 lb., terms 60 days or 2 per cent. discount in 10 days, carload lots to jobbers, annealed, \$1.35; galvanized, \$1.75. Galvanized barb wire and fence staples to jobbers, \$1.95; painted, \$1.55. Wire nails to jobbers, \$1.55. Woven

wire fencing, 73 per cent. off list for carloads; 72 off for 1000-rod lots; 71 off for less than 1000-rod lots.

The following table gives the price to retail merchants on fence wire in less than carloads, with the extras added to the base price:

	Plain Wire, per 100 lb.									
Nos.	0 to 9	10	11	12	12½	13	14	15	16	
Annealed	\$1.50	\$1.55	\$1.60	\$1.65	\$1.75	\$1.85	\$1.95	\$2.05		
Galvanized	1.90	1.95	2.00	2.05	2.15	2.25	2.35	2.45		

Wire Rods.—Bessemer, open-hearth and chain rods, \$25.

Wrought Pipe.—The following are the jobbers' carload discounts on the Pittsburgh basing card on steel pipe in effect from November 2, 1914, and iron pipe from June 2, 1913, all full weight.

Butt Weld				Lap Weld			
Steel		Iron		Steel		Iron	
Inches	Black	Galv.		Inches	Black	Galv.	
½, ¾ and 1	74	53½		½ and ¾	66	47	
1½	78	67½		¾	65	46	
¾ to 3	81	72½		1½	69	56	
				¾ to 2½	72	61	
2	78	69½		1½	56	45	
2½ to 6	80	71½		1½	67	56	
7 to 12	77	66½		2	68	58	
13 and 14	63½			2½ to 4	70	61	
15	61			4½ to 6	70	61	
				7 to 12	68	55	

Reamed and Drifted			
Inches	Black	Galv.	
1 to 3, butt	79	70½	70
2, lap	76	67½	70
2½ to 6, lap	78	69½	70
1 to 1½, butt	70	59	
2, butt	70	59	
1½, lap	54	43	
1½, lap	65	54	
2, lap	66	56	
2½ to 4, lap	68	59	

Butt Weld, extra strong, plain ends			
Inches	Black	Galv.	
½, ¾ and 1	69	58½	63
1½	74	67½	67
¾ to 1½	78	71½	71
2 to 3	79	72½	72
2 and 2½	72	63	

Lap Weld, extra strong, plain ends			
Inches	Black	Galv.	
2	75	66½	65
2½ to 4	77	68½	66
4½ to 6	76	67½	70
7 to 8	69	58½	69
9 to 12	64	53½	63
1½	58	47	
2	58	47	
2½ to 4	60	54	
4½ to 6	59	53	
7 to 8	53	43	
9 to 12	48	38	

Butt Weld, double extra strong, plain ends			
Inches	Black	Galv.	
½	64	57½	57
¾ to 1½	67	60½	60
2 to 2½	69	62½	62
2 and 2½	62	54	

Lap Weld, double extra strong, plain ends			
Inches	Black	Galv.	
2	65	58½	55
2½ to 4	67	60½	60
4½ to 6	66	59½	59
7 to 8	59	48½	53
2	55	49	
2½ to 4	60	54	
4½ to 6	59	53	
7 to 8	53	43	

To the large jobbing trade an additional 5 per cent. is allowed over the above discounts.

The above discounts are subject to the usual variation in weight of 5 per cent. Prices for less than carloads are two (2) points lower basing (higher price) than the above discounts on black and three (3) points on galvanized.

Boiler Tubes.—Discounts to jobbers, in carloads, in effect from May 1, 1914, on steel and from January 2, 1914, on iron, are as follows:

Lap Welded Steel		Standard Charcoal Iron	
Inches	Black	Inches	Black
1½ and 2 in.	62	1½ in.	45
2½ in.	59	1½ and 2 in.	49
2½ and 3 in.	65	2½ in.	45
3 and 3½ in.	70	2½ and 3 in.	54
3½ and 4 in.	72	3 and 3½ in.	57
5 and 6 in.	65	3½ and 4 in.	60
7 to 13 in.	62	5 and 6 in.	49

Locomotive and steamship special charcoal grades bring higher prices.

2½ in. and smaller, over 18 ft., 10 per cent. net extra.

3½ in. and larger, over 22 ft., 10 per cent. net extra. Less than carloads will be sold at the delivered discounts for carloads, lowered by two points for lengths 22 ft. and under to destinations east of the Mississippi River; lengths over 22 ft., and all shipments going west of the Mississippi River must be sold f.o.b. mill at Pittsburgh basing discount, lowered by two points. On standard charcoal iron tubes for desirable orders the above discounts are shaded an extra 5, and occasionally two 5's by some makers.

Sheets.—Makers' prices for mill shipment on sheets of U. S. Standard gauge, in carload and larger lots, on which jobbers charge the usual advance for small lots from store, are as follows, f.o.b. Pittsburgh, terms 30 days net, or 2 per cent. cash discount in 10 days from date of invoice:

Blue Annealed Sheets		Cents per lb.
Nos.		
3 to 8		1.25 to 1.30
9 to 10		1.30 to 1.35
11 and 12		1.35 to 1.40
13 and 14		1.45 to 1.50
15 and 16		1.55 to 1.60

Box Annealed Sheets, Cold Rolled

	Cents per lb.
Nos. 10 and 11.....	1.45 to 1.50
No. 12.....	1.45 to 1.50
Nos. 13 and 14.....	1.50 to 1.55
Nos. 15 and 16.....	1.55 to 1.60
Nos. 17 to 21.....	1.60 to 1.65
Nos. 22 and 24.....	1.65 to 1.70
Nos. 25 and 26.....	1.70 to 1.75
No. 27.....	1.75 to 1.80
No. 28.....	1.80 to 1.85
No. 29.....	1.85 to 1.90
No. 30.....	1.95 to 2.00

Galvanized Sheets of Black Sheet Gauge

	Cents per lb.
Nos. 10 and 11.....	1.75 to 1.80
No. 12.....	1.85 to 1.90
Nos. 13 and 14.....	1.85 to 1.90
Nos. 15 and 16.....	2.00 to 2.05
Nos. 17 to 21.....	2.15 to 2.20
Nos. 22 and 24.....	2.30 to 2.35
Nos. 25 and 26.....	2.45 to 2.50
No. 27.....	2.60 to 2.65
No. 28.....	2.75 to 2.80
No. 29.....	2.90 to 2.95
No. 30.....	3.05 to 3.10

Pittsburgh

PITTSBURGH, PA., January 12, 1915.

The market has quieted down, and the amount of new business entered by the mills so far this month has been relatively small. It is believed that the orders booked in December in plates, shapes and steel bars at the 1.05c. price were much greater than generally supposed, and the large trade is pretty well covered for these products through first quarter. Possibly 85 per cent. of the tin plate to be made this year is also under contract. The mills are running at a slightly larger rate of operation, as specifications against the contracts made in December are coming in quite freely. The feeling is more optimistic than for some time. The most active item on the list at present is old material, for which there is a good demand, and the higher prices reached are being firmly held. Nothing is doing in coke, as the active blast furnaces are covered.

Pig Iron.—The Westinghouse Electric & Mfg. Company has not closed for its foundry iron for the last nine months of this year, but may do so this week. Some furnaces are not anxious to quote on this inquiry, as the deliveries run so far ahead. There has been a slight decline in the price of Bessemer iron, a fairly large consumer having bought 500 tons of standard Bessemer for January shipment at \$13.50, and 500 tons each for February and March at \$13.60, Valley furnace, or \$14.55, Pittsburgh. We note sales of 6000 to 7000 tons of basic for delivery through first and second quarters at \$12.50, Valley furnace. We quote Bessemer iron at \$13.60; basic, \$12.50; malleable Bessemer, \$12.75; No. 2 foundry, \$13 to \$13.25, and gray forge, \$12.50, all at Valley furnace, with a freight rate of 95c. a ton for delivery in the Cleveland and Pittsburgh districts.

Billets and Sheet Bars.—There is a fair amount of new inquiry for first quarter delivery, and some contracts have been made on the basis of \$19 for 4 x 4-in. Bessemer and open-hearth billets, and \$20 for Bessemer and open-hearth sheet bars, f.o.b. Pittsburgh. Specifications against contracts for sheet bars from the tin-plate mills are more active than for some time. We quote Bessemer and open-hearth billets at \$18.50, and Bessemer and open-hearth sheet bars \$19, f.o.b. maker's mill, Youngstown; Bessemer and open-hearth billets, \$19, and Bessemer and open-hearth sheet bars, \$20, f.o.b. maker's mill, Pittsburgh. Forging billets are quoted at \$24 for sizes up to but not including 10 x 10 in., and for carbons up to 0.25, the regular extras being charged for larger sizes and higher carbons. Forging billets running above 0.25 to 0.60 carbon take \$1 per ton extra. Axle billets are quoted at \$21 to \$22.

Ferroalloys.—Nothing is doing in this market in the way of new sales, but prices on English 80 per cent. ferromanganese are very firm, due to the belief that there may be a shortage in supply before long. Consumers are getting prompt deliveries and are pretty well covered for the next two or three months. We quote 50 per cent. ferrosilicon, in lots up to 100 tons, at \$73; over 100 tons to 600 tons, \$72; over 600 tons, \$71, delivered in the Pittsburgh district. On 10 per cent. ferrosilicon the quotation is \$19; 11 per cent., \$20, and 12 per cent., \$21, f.o.b. cars Jackson County, Ohio, or

Ashland, Ky., furnace. We quote 20 per cent. spiegel-eisen at \$25 at furnace. We quote ferrotitanium at 8c. per lb. in carloads; 10c. in 2000-lb. lots and over, and 12½c. in less than 2000-lb. lots.

Steel Rails.—Of the inquiry of the Pennsylvania Railroad for 170,000 tons of rails for 1915 delivery, it is believed that at least 150,000 tons will be distributed in a short time to the mills that usually take this business, and the other 20,000 tons will be given out later in the year. The Carnegie Steel Company has taken 4000 tons for the Cincinnati, Hamilton & Dayton. It is said that at least two leading roads will be in the market in a short time for their 1915 rail requirements, and we also note that some heavy foreign inquiry is pending, one being reported for 15,000 to 20,000 tons for shipment to Russia. The new demand for light rails is only fair. Those rolled from billets are held about \$1 a ton higher than rerolled light rails. We quote standard section rails made of Bessemer stock at 1.25c., and of open-hearth, 1.34c., f.o.b. Pittsburgh. We quote lights rails as follows, in carload lots: 8 and 10 lb. sections, 1.275c.; 12 and 14 lb., 1.225c.; 16 and 20 lb., 1.175c.; 25, 30, 35, 40 and 45 lb. sections, 1.125c.

Structural Material.—The week has been quiet as to contracts, but there is a good deal of new inquiry. The McClintic-Marshall Company has taken 850 tons for the Sylvan bridge in this city and about 550 tons for freight sheds for the Santa Fé Railroad in Los Angeles, Cal. The Pennsylvania Railroad has divided 750 to 800 tons of bridge work among the Fort Pitt Bridge Works, the McClintic-Marshall Company and the Lackawanna Bridge Company. We quote beams and channels up to 15-in. at 1.10c. for first quarter and 1.15c. for second quarter.

Plates.—The order of the Cincinnati, Hamilton & Dayton for 2000 cars, referred to in this report last week, has been placed, the Cambria Steel Company getting 1000 steel hoppers and the Mt. Vernon Car & Mfg. Company 1000 wooden box cars. The road has an option on a duplication of the order from each of these builders. The report that the Baltimore & Ohio has placed 20,000 cars, divided among three companies, cannot be confirmed here. Active inquiries out include 15 all-steel passenger cars for the Chicago & Milwaukee Electric Railroad, 400 ore cars for the Lake Superior & Ishpeming Railroad and 200 steel tank cars for the Prudential Oil Company. Mills report new demand for plates as slightly better, and the 1.10c. price is being quoted on new business. We quote ¼-in. and heavier plates at 1.10c., Pittsburgh, for first quarter.

Sheets.—Consumers are placing contracts quite actively for first quarter delivery. While 1.80c. is regarded as the minimum price on No. 28 black sheets by most mills, a few are shading this price about \$1 a ton. Prices on galvanized sheets are firmer, due to the recent advances in spelter. Mill operations are on a 60 to 65 per cent. basis. We quote No. 28 Bessemer black sheets at 1.80c.; No. 28 galvanized, 2.75c.; Nos. 9 and 10 blue annealed, 1.30c.; No. 30 black plate, tin-mill sizes, H. R. & A., 1.95c.; No. 28, 1.90c.; Nos. 27, 26 and 25, 1.85c.; Nos. 22 to 24, 1.80c.; Nos. 17 to 21, 1.75c.; Nos. 15 and 16, 1.70c. The above prices are for carload lots, f.o.b. at maker's mill, jobbers charging the usual advances for small lots from store.

Tin Plate.—This trade is quiet, as practically all consumers that buy their requirements for the year have covered. It is said there is less inclination on the part of makers to shade prices now than in December. We quote 14 x 20 coke plates at \$3.10 to \$3.15, but for a desirable order the \$3.10 price would be shaded.

Wire Rods.—Foreign inquiry has quieted down and domestic demand is also dull. The rod mills are running quite full to supply material for the wire mills, which are now active. We quote Bessemer, open-hearth and chain rods at \$25, f.o.b. Pittsburgh.

Shafting.—The new demand is better. Makers report that specifications against contracts from automobile builders are active, but from implement makers are dull. Some contracts have been made for first quarter and first half. We quote cold-rolled shafting at 67 to 68 per cent. off, depending on the order.

Railroad Spikes.—Estimates are that from 100,000 to 125,000 kegs of spikes have been bought in the past week or so. The larger orders were the Baltimore & Ohio, 30,000 kegs, all taken by one local interest; Pennsylvania Lines West, 20,000 kegs; Norfolk & Western, 5000 kegs, and the Boston & Maine, 1800 kegs. The New York Central has not yet placed its contract but is expected to buy from 30,000 to 40,000 kegs, which will be divided among three or four makers. We quote railroad spikes at \$1.35 to \$1.40, and small spikes at \$1.45 to \$1.50, in carload and larger lots, f.o.b. Pittsburgh, for first half.

Skelp.—The market is dull, but prices are fairly strong. There has been no foreign inquiry for skelp for some time. We quote: Grooved steel skelp, 1.10c. to 1.15c.; sheared steel skelp, 1.15c. to 1.20c.; grooved iron skelp, 1.50c.; sheared iron skelp, 1.50c. to 1.60c.; delivered to consumers' mills in the Pittsburgh district.

Hoops and Bands.—The market on steel bands is now 1.10c., and on steel hoops 1.25c. for first quarter. However, most consumers of steel bands covered for first quarter at 1.05c., and on steel hoops at about 1.20c. We quote steel bands at 1.10c., with extras as per the steel bar card, and steel hoops at 1.25c., f.o.b. Pittsburgh, for first quarter.

Wire Products.—Effective, Monday, January 11, prices on wire products were advanced \$1 per ton. It is understood, however, that large consumers of wire nails and wire have covered for first quarter on the basis of \$1.50 for wire nails and \$1.30 for plain wire. New business is quiet, but specifications against contracts are coming in at a fair rate. Prices are now as follows: Wire nails, \$1.55; plain annealed wire, \$1.35; galvanized barb wire and fence staples, \$1.95; painted barb wire, \$1.55, all f.o.b. Pittsburgh, freight added to point of delivery, terms 30 days net, less 2 per cent. for cash in 10 days. Prices on woven wire fencing have not been changed as yet, and we quote 73 per cent. off in carload lots, 72 per cent. on 1000-rod lots and 71 per cent. on small lots, f.o.b. Pittsburgh.

Iron and Steel Bars.—New buying of sheet bars is light, as the trade is pretty well covered. The demand for iron bars is dull. We quote steel bars at 1.10c. for first quarter, and common iron bars, made from part scrap, at 1.15c., f.o.b. Pittsburgh.

Merchant Steel.—Mills report no betterment in demand, which is mostly for small lots for prompt shipment. Some contracts were placed in December for first quarter, but the amount of this business was less than a year ago. Prices on small lots for prompt shipment are as follows: Iron finished tire, $\frac{1}{2}$ x $\frac{1}{2}$ in., and larger, 1.30c., base; under $\frac{1}{2}$ x $\frac{1}{2}$ in., 1.45c.; planished tire, 1.50c.; channel tire, $\frac{3}{4}$ to $\frac{1}{2}$ and 1 in., 1.80c. to 1.90c.; $\frac{1}{2}$ in. and larger, 1.90c.; toe calk, 1.90c. to 2c., base; flat sleigh shoe, 1.65c.; concave and convex, 1.70c.; cutter shoe, tapered or bent, 2.20c. to 2.30c.; spring steel, 1.90c. to 2c.; machinery steel, smooth finish, 1.70c.

Cold-Rolled Strip Steel.—So far as can be learned, the 2300 tons of cold-rolled strip steel for which Russia was inquiring has not been placed. Mills report new demand fair, but one or two makers are not willing to sell ahead very far at present low prices. We quote cold-rolled strip steel as follows: Hard-rolled steel, $\frac{1}{2}$ -in. and wider, under 0.20 carbon, sheared or natural mill edges, per 100 lb., \$2.75 delivered. Extras, which are standard among all the mills, are as follows:

Thickness, in.	Extras for thickness	Extras for soft or intermediate tempers	Extras for straightening and cutting to lengths not less than 24 in.
0.100 and heavier	Base	\$0.25	\$0.10
0.099 to 0.050	\$0.05	0.25	0.15
0.049 to 0.035	0.20	0.25	0.15
0.034 to 0.031	0.35	0.40	0.25
0.030 to 0.025	0.45	0.40	0.40
0.024 to 0.020	0.55	0.40	0.50
0.019 to 0.017	0.85	0.50	1.10
0.016 to 0.015	1.25	0.50	1.10
0.014 to 0.013	1.95	0.50	1.25
0.012	2.30	0.50	coils only
0.011	2.65	0.50	coils only
0.010	3.00	0.50	coils only

Wrought Pipe.—The demand for wrought-iron and steel pipe so far this month has not been as heavy as in the same period in December. Reports are that a

local mill has taken 80 miles of line pipe for delivery to Canada, but this cannot be confirmed. The Illinois Tank Line Company, just organized, is expected to be in the market in a short time for several large oil lines. Discounts on iron and steel pipe are firmly held.

Boiler Tubes.—The new demand for both locomotive and merchant tubes is quiet, and discounts are still being more or less shaded.

Coke.—The local market is quiet, as all the active blast furnaces have covered their needs for first half and in some cases over all of this year. Prices on prompt furnace coke are weaker, and we note a sale of about 6000 tons for delivery this and next week at \$1.60 per net ton at oven. We quote standard makes of blast-furnace coke for prompt shipment at \$1.50 to \$1.60, and on contracts for first half and through all of 1915 at \$1.75 per net ton at oven. Standard makes of 72-hr. foundry coke are held at about \$2 for prompt shipment, and \$2.15 to \$2.25 per net ton at oven on contracts. The Connellsville Courier reports the output of coke in the upper and lower Connellsville regions for the week ended January 2 as 202,497 net tons, a decrease over the previous week of 5633 tons.

Old Material.—The local scrap market is active and the recent advances are well held. It is stated that the Pennsylvania Lines West sold their heavy melting steel scrap last week at \$11.70 per gross ton, f.o.b. cars Pittsburgh, to a local consumer. The demand for steel making scrap is heavy, and prices on compressed side and end sheet scrap and on bundled sheet scrap are higher. We note a sale of 700 tons of turnings at \$7.75 per gross ton delivered, and about 3000 tons of selected heavy steel scrap at \$11.75, delivered. It is said some small lots of heavy steel scrap have sold at as high as \$12, delivered. For delivery to consumers' mills in the Pittsburgh and other consuming districts that take Pittsburgh freights, dealers quote as follows:

Heavy steel melting scrap, Steubenville, Follansbee, Brackenridge, Sharon, Monessen, Midland and Pittsburgh delivery	\$11.75
Compressed side and end sheet scrap	\$10.75 to 11.00
No. 1 foundry cast	11.25 to 11.50
Bundled sheet scrap, f.o.b. consumers' mills, Pittsburgh district	9.50 to 9.75
Rerolling rails, Newark and Cambridge, Ohio, Cumberland, Md., and Franklin, Pa.	11.75 to 12.00
No. 1 railroad malleable stock	10.00 to 10.25
Railroad grate bars	8.50 to 8.75
Low phosphorus melting stock	13.25 to 13.50
Iron car axles	18.75 to 19.25
Steel car axles	13.25 to 13.75
Locomotive axles, steel	19.75 to 20.25
No. 1 busheling scrap	9.75 to 10.00
No. 2 busheling scrap	7.00 to 7.25
Machine shop turnings	7.75
Old carwheels	10.75 to 11.00
Cast-iron borings	8.25 to 8.50
*Sheet bar crop ends	12.00 to 12.25
Old iron rails	12.75 to 13.00
No. 1 railroad wrought scrap	10.75 to 11.00
Heavy steel axle turnings	8.50 to 8.75
Heavy breakable cast scrap	10.75 to 11.00

*Shipping point.

Thomas R. Heyward, Jr., formerly of the local office of Walter Wallingford & Co., and Charles Daker, formerly with the local office of Matthew Addy & Co., have formed a partnership under the name of Heyward & Daker, with offices in room 1502 Farmers Bank Building, and will handle pig iron, coke, scrap, and other materials. Mr. Daker will still retain his alloy account. The local office of Matthew Addy & Co., formerly in the Farmers Bank Building, has been discontinued.

Chicago

CHICAGO, ILL., January 12, 1915.

The improvement in iron and steel last-week was of small degree. Inquiry, specifications and new orders were received by most of the steel companies in this market in about the same larger volume as was shown from week to week in December. One important handicap operating against a more pronounced change for the better is the fact that in no direction is there any particular class of buyers who appear really to need materials at this time in any quantity. The mills must still content themselves with the incidental business that develops from day to day and it is fortunate that the volume of this is as large as it is. Western

mills will doubtless participate in the rolling of rails for the Lake Shore, Pennsylvania and Baltimore & Ohio lines. They will also furnish some of the steel for 2000 Baltimore & Ohio cars finally placed. The market indicates no questioning of 1.10c., Pittsburgh, for shapes and bars, but concerning plates some doubt is expressed. The buying of sheets has picked up and for this week at least the local independent mill is operating in full. The pig-iron market is very quiet. Prices for scrap still pursue their upward tendency.

Pig Iron.—The inquiries and sales of the past week in the pig-iron market have been quite insignificant. The market appears to be passing through a between-time period upon the length of which the price of local iron very nearly depends. A hoped for resumption of buying during the current month is in large measure at the bottom of present firmness. Encouragement is also had from the fact that shipments on contracts beginning January 1 have been going forward with practically no holding up of schedules by melters. The Southern situation is unchanged and \$9.50, Birmingham, is the going price. The following quotations are for iron delivered at consumers' yards, except those for Northern foundry, malleable Bessemer and basic iron, which are f.o.b. furnace and do not include a switching charge averaging 50c. a ton:

Lake Superior charcoal	\$15.75 to \$16.75
Northern coke foundry, No. 1	13.25 to 13.75
Northern coke foundry, No. 2	13.00 to 13.25
Northern coke foundry, No. 3	12.50 to 13.00
Southern coke, No. 1 f'dry and 1 soft	13.75 to 14.25
Southern coke, No. 2 f'dry and 2 soft	13.50 to 13.75
Malleable Bessemer	13.00 to 13.25
Standard Bessemer	15.50
Basic	12.50 to 13.00
Low phosphorus	20.00 to 20.50
Jackson Co. and Ky. silvery, 6 per cent.	16.90 to 17.40
Jackson Co. and Ky. silvery, 8 per cent.	17.90 to 18.40
Jackson Co. and Ky. silv'y, 10 per cent.	18.90 to 19.40

Rails and Track Supplies.—The outlook for Western rail mills is largely brightened by the expectation of rolling a part of the rails contemplated for purchase by the Baltimore & Ohio, Lake Shore and Pennsylvania systems. As yet very little has been indicated by Western railroads as to their programme. The taking of fastenings, which is normal at this time of year, continues. We quote standard railroad spikes at 1.50c. to 1.60c., base; track bolts with square nuts, 1.90c. to 2c. base, all in carload lots, Chicago; tie plates, \$23.50 to \$25, f.o.b. mill, net ton; standard section Bessemer rails, Chicago, 1.25c., base; open-hearth, 1.34c.; light rails, 25 to 45 lb., 1.07c.; 16 to 20 lb., 1.12c.; 12 lb., 1.17c.; 8 lb., 1.22c.; angle bars, 1.50c., Chicago.

Structural Material.—The Baltimore & Ohio has finally placed its orders for 2000 cars, 1000 of which, for the Cincinnati, Hamilton & Dayton, are to be built by the Mt. Vernon Car Company. The other cars, involving the much needed plate tonnage, are to be built in the East. The most important architectural letting of the week was the 1500 tons taken by the American Bridge Company for the Buck & Rayner Building, Chicago. It is announced that bids will be received January 16 for the steel for the Lyon & Healy Building. In Texas contracts were placed for 513 tons for the Galveston city hall and 870 tons for the State normal school at Canyon City. Specifications for plain material from mill during the week were hardly sufficient to be satisfying and yet were somewhat larger than recent averages. The market appears to be well established on shapes at 1.10c., Pittsburgh. We quote for Chicago delivery of shapes from mill, 1.289c.

We quote for Chicago delivery of structural material from store 1.75c.

Plates.—Plate tonnage continues one of the most insistent needs of the market from the mill standpoint, and this fact coupled with the diversity of mills making plates is reflected in the less assured attitude as to plate prices. The larger interests continue to maintain plates on the same basis with bars and shapes, but this does not hold true for all producers. We quote for Chicago delivery of plates from mill, 1.25c. to 1.289c.

We quote for Chicago delivery of plates out of stock 1.75c.

Sheets.—Jobbers and manufacturing users of sheets have been ordering out tonnage at a rate which shows

an improvement in excess of that attained for any other of the principal steel products. Accordingly the mill situation in this market is for the time being considerably relieved and the Indiana Harbor Works this week has all of its mills in service. The extreme weakness in price is a sufficient explanation of the logic of buyers' present activity. We quote for Chicago delivery from mill: No. 10 blue annealed, 1.489c.; No. 28 black, 1.989c.; No. 28 galvanized, 2.889c. to 2.939c.

We quote for Chicago delivery from jobbers' stocks as follows, minimum prices applying on bundles of 25 or more: No. 10 blue annealed, 1.95c.; No. 28 black, 2.55c.; No. 28 galvanized, 3.55c.

Bars.—The demand for reinforcing bars is beginning to appear in a way indicating a planning for spring work. Other steel-bar business is routine and price is very generally accepted on the new basis being asked by the mills. Bar-iron tonnage shows a slight increase in volume which is a little more than can be said in regard to prices. We quote for mill shipments as follows: Bar iron, 0.97½c. to 1.02½c.; soft steel bars, 1.289c.; hard steel bars, 1.20c.; shafting in carloads, 65 per cent. off; less than carloads, 60 per cent. off.

We quote store prices for Chicago delivery: Soft steel bars, 1.65c.; bar iron, 1.65c.; reinforcing bars, 1.65c. base, with 5c. extra for twisting in sizes ½ in. and over and usual card extras for smaller sizes; shafting 60 per cent. off.

Rivets and Bolts.—The bolt situation has benefited from without rather than from within in the nominal maintenance of quotations. There is less likelihood in the immediate future of lower prices than has been true in several weeks past. New business is confined, where it comes up, to minimum requirements. We continue to quote: Carriage bolts up to ¾ x 6 in., rolled thread, 85; cut thread, 80-20; larger sizes, 80; machine bolts up to ¾ x 4 in., rolled thread, 85-5; cut thread, 85; larger sizes, 80-5; coach screws, 85-10; hot pressed nuts, square head, \$6.60 off per cwt.; hexagon, \$7.60 off per cwt. Structural rivets, ¾ to 1½ in., 1.58c., base, Chicago, in carload lots; boiler rivets, 10c. additional.

Nominally we quote out of store: Structural rivets, 2.20c.; boiler rivets, 2.30c.; machine bolts up to ¾ x 4 in., 75-15; larger sizes, 70-10-10; carriage bolts up to ¾ x 6 in., 75-10; larger sizes, 70-15 off; hot pressed nuts, square head, \$6, and hexagon, \$6.70 off per cwt.

Old Material.—The continued advance of prices in the scrap market has stirred up a considerably wider buying by consumers. Rolling-mill grades are all in fairly good demand, while of No. 1 busheling there is a market scarcity. A renewed buying of heavy melting steel is reported. Prices of the principal items this week are again 25c. to 50c. a ton higher than a week ago, nor does that advance represent all that has been done in absorbing the scrap recently offered by the railroads. During the week the Chicago & Northwestern sold a list of 4000 tons and the Milwaukee system 2000 tons. The Omaha is offering 700 tons, the Frisco 400 tons, the Burlington 1500 tons and the Soo Line 600 tons. We quote for delivery at buyers' works, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Old iron rails	\$11.25 to \$11.50
Old steel rails, rerolling	9.50 to 10.00
Old steel rails, less than 3 ft.	8.75 to 10.00
Old carwheels	10.00 to 10.50
Heavy melting steel scrap	8.00 to 9.50
Frogs, switches and guards, cut apart	9.00 to 9.50
Shoveling steel	8.50 to 9.00
Steel axle turnings	7.25 to 7.50

Per Net Ton	
Iron angles and splice bars	\$11.00 to \$11.50
Iron arch bars and transoms	11.00 to 11.50
Steel angle bars	8.25 to 8.50
Iron car axles	14.00 to 14.25
Steel car axles	10.75 to 11.25
No. 1 railroad wrought	8.75 to 9.25
No. 2 railroad wrought	8.25 to 8.75
Cut forge	8.25 to 8.75
Steel knuckles and couplers	8.50 to 8.75
Steel springs	9.25 to 9.75
Locomotive tires, smooth	8.50 to 9.00
Machine shop turnings	5.50 to 5.75
Cast borings	4.50 to 5.00
No. 1 busheling	8.25 to 8.50
No. 2 busheling	7.00 to 7.25
No. 1 boilers, cut to sheets and rings	5.25 to 5.75
Boiler punchings	8.00 to 8.25
No. 1 cast scrap	9.25 to 9.50
Stove plate and light cast scrap	8.25 to 8.50
Grate bars	8.00 to 8.25
Railroad malleable	8.25 to 8.50
Agricultural malleable	7.25 to 7.50
Pipes and flues	7.00 to 7.50

Wire Products.—Orders for wire have shown a substantial gain, which is due in part, it is reported, to the expected restoration of prices to the basis of 1.55c., Pittsburgh. Some of the larger operators are sending in their after-inventory stock orders, while other smaller dealers are protecting themselves on carloads to secure the advantage of any possible price change. We quote to jobbers as follows: Plain wire, No. 9 and coarser, base, \$1.489; wire nails, \$1.689; painted barb wire, \$1.689; galvanized, \$2.089; polished staples, \$1.689; galvanized, \$2.089, all Chicago.

Cast-Iron Pipe.—In addition to the 1000 tons to be awarded at Cincinnati there is now nearly 4000 tons of municipal lettings reported, including 250 tons at Ferdinand, Ind., 500 tons at New Boston, Ohio, 300 tons at Carroll, Iowa, 1500 tons at Kansas City, Mo., and 1200 tons at St. Paul, Minn. We quote as follows, per net ton, Chicago: Water pipe, 4 in., \$25.50; 6 to 12 in., \$23.50; 16 in. and up, \$23, with \$1 extra for gas pipe.

Philadelphia

PHILADELPHIA, PA., January 12, 1915.

The conspicuous features of the market are the unanimity with which the recently established minimum of 1.25c., Philadelphia, based on 1.10c., Pittsburgh, is being held by manufacturers of plates, shapes and steel bars and the general unwillingness to sell far ahead at existing quotations. It is apparent that these manufacturers desire to hold their capacities open for the looked-for demand, with which will come better prices. The best and most promising activity in steel at this time is in railroad track equipment. The buying of cars and locomotives would help immensely, but little seems to be coming up, although a local company booked an order for 1000 hopper cars for the Baltimore & Ohio Railroad. Bars, plates and shapes are quiet and billets particularly so, while in sheets a slight improvement is felt. A few rather good inquiries for pig iron are out, but the past few days have been dull so far as sales are concerned. The old material market is unchanged, except that it is a little stronger in sympathy with Western prices.

Iron Ore.—Importations in the week ended January 9 consisted of 4700 tons from Cuba, 7300 tons from Chile and 738 tons from France. New business continues lacking, one effect of which will be the shutting down of the El Cuero mine of the Ponupo Manganese Company in Cuba, as soon as existing contracts are completed.

Pig Iron.—In the aggregate, both sales and inquiries have been light, but the trade still has faith in the future and is not in an uncheerful frame of mind. All the indications are that there has been no increase in the melting of iron in this territory, but deliveries on contract are going on without interruption, there having been a check to the postponements that were noted in the latter part of December. The few inquiries which are out mostly call for from 300 to 500 tons and for miscellaneous grades. Among the larger inquiries is one for 3000 tons of basic and another for 500 tons to 1000 tons of eastern Pennsylvania No. 2 X for second quarter delivery from a maker of plumbing appliances. Low phosphorus iron has moved in small lots only, and there have been few of these. A representative seller of Virginia iron sold but 340 tons of foundry iron in the week ended January 9, although the same company placed 2500 tons of pipe iron with Virginia foundries. Quotations for standard brands for early delivery in buyers' yards in this district are as follows:

Eastern Penna. No. 2 X foundry.....	\$14.25 to \$14.50
Eastern Penna. No. 2 plain.....	14.00 to 14.25
Virginia No. 2 X foundry.....	15.25
Virginia No. 2 plain.....	15.00
Gray forge.....	13.50 to 13.75
Basic.....	13.50 to 14.00
Standard low phosphorus.....	20.00 to 21.00

Ferroalloys.—The situation with regard to 80 per cent. ferromanganese appears to be unchanged. With the attitude of England still the dominating phase of the subject, hope is expressed that the embargo will soon be raised. The nominal quotation is \$68, sea-

board. For 50 per cent. ferrosilicon, \$71 to \$73, Pittsburgh, is asked.

Bars.—The demand for steel bars is quiet, with bookings confined mostly to nearby deliveries, the mills being unwilling to take on contracts at present prices. They are holding firmly to 1.25c., Philadelphia, for first quarter business and 1.30c. for second quarter, the latter being especially strong. For iron bars there has been an improved inquiry, but consumers are asking for price concessions that the mills are unwilling to grant. The quotation for a good grade of common iron bars is unchanged at about 1.17½c., Philadelphia.

Plates.—Local mills are adhering to 1.25c., Philadelphia, on business of fair size and have booked some contracts at 1.30c., but they are taking future business cautiously and not seeking it at the existing quotation. In point of orders the week has been disappointing, in that it shows no improvement in volume. Mills are operating at 50 to 55 per cent. of capacity and probably will not do better until the railroads become more active in the purchase of cars and locomotives.

Structural Material.—The demand for shapes, either plain or fabricated, shows no improvement in this territory and, if changed at all, is even flatter than heretofore. Business is adversely affected by the lapse which is intervening between new and old jobs. The mills are not looking for contracts and will not enter them except in cases where a specific job is under consideration, the plans and specifications for which are yet to be made. For first quarter 1.25c., Philadelphia, is being firmly held. Among the few projects mentioned is an addition to a building of the Townsend-Grace Company, Baltimore, which will require between 500 and 600 tons, and for which Irwin & Leighton have the general contract. A warehouse for the Navy Department, Washington, heretofore referred to, will be a concrete building instead of steel, but about 400 tons of steel bars will be required. George S. Wyne, Washington, has the contract. Inquiries for a high school in Washington, D. C., are expected in the course of two or three weeks. It is expected to take a large tonnage.

Sheets.—The request for sheets has improved a little, but it is far from satisfactory and consumers still demand low prices. Makers, however, are inclined to ask 1.50c., Philadelphia, rather than the 1.45c. which they have been accepting.

Billets.—There seems to be a general lack of interest on all sides so far as consumers are concerned. A local company has started its blooming mill after a shut down of about two weeks and will run to satisfy some of its own needs as well as those of a neighbor. This company has exported two lots of billets and is waiting for repeat orders, but these are not yet in sight nor has any word been received as to how satisfactory the steel was considered. Open-hearth rolling billets are unchanged at \$21.40, Philadelphia, while forging steel commands \$4 over this price.

Old Material.—The situation is quiet here, with almost no call from the local mills in comparison with the good demand for suitable material in the West. In several cases those who sell to brokers are holding for higher prices than those offered. Quotations for delivery in buyers' yards in this district, covering eastern Pennsylvania and taking freight rates from 35c. to \$1.35 per gross ton, are as follows:

No. 1 heavy melting steel.....	\$10.00 to \$10.50
Old steel rails, rerolling.....	10.50 to 11.00
Low phosphorus heavy melting steel	
scrap.....	14.00 to 14.50
Old steel axles.....	13.50 to 14.00
Old iron axles.....	17.50 to 18.00
Old iron rails.....	13.00 to 14.00
Old carwheels.....	11.00 to 11.50
No. 1 railroad wrought.....	12.00 to 12.50
Wrought-iron pipe.....	9.50 to 10.00
No. 1 forge-fire.....	8.00 to 8.50
Bundled sheets.....	8.00 to 8.50
No. 2 busheling.....	7.75 to 8.25
Machine shop turnings.....	8.00 to 8.50
Cast borings.....	8.00 to 8.50
No. 1 cast.....	12.00 to 12.50
Grate bars, railroad.....	8.50 to 9.00
Stove plate.....	8.50 to 9.00
Railroad malleable.....	9.00 to 9.50

Coke.—Some belated contracts have been closed for furnace coke, but foundry coke continues devoid of interest. Standard Connellsville contract furnace coke is

quoted at \$1.70 to \$1.75 per net ton at oven, with prompt at about \$1.60, and it is said this latter price has been shaded. Prompt foundry is quoted at \$2 to \$2.20 per net ton at oven and contract at \$2.10 to \$2.30. Freight rates from the principal producing districts are as follows: Connellsville, \$2.05; Latrobe, \$1.85, and Mountain, \$1.65.

G. F. Ehrenzeller, Pennsylvania Building, Philadelphia, is now representing the Carlton Iron Company, of England, in the sale of ferromanganese and spiegeleisen in addition to his other connections.

Cleveland

CLEVELAND, OHIO, January 12, 1915.

Iron Ore.—Shipments from Lake Erie docks to furnaces in December were 355,076 tons as compared with 704,851 tons for the corresponding month of 1913. For the year the docks sent forward 18,005,185 tons. In 1913 the movement to the furnaces was 26,824,725 tons. The docks were in somewhat better shape January 1 than they were a year ago, as stocks were 571,028 tons less; on January 1, 1915, the amount of ore on dock was 8,051,910 tons as compared with 8,622,938 tons on January 1, 1914. Reports indicate that stocks in furnace yards are approximately 2,200,000 tons larger than normal. In 1914 Canadian shipments of ore from the Lake Superior District were 29,741 tons from Key Harbor and 90,483 tons from Michipicoten, making the total movement by water 32,142,121 tons. We quote prices as follows: Old Range Bessemer, \$3.75; Mesaba Bessemer, \$3.50; old Range non-Bessemer, \$3; Mesaba non-Bessemer, \$2.85.

Pig Iron.—The market is exceedingly dull. The only sales reported are a few small lots and there is little new inquiry. Locally the market has stiffened, the \$13 furnace price for No. 2 foundry for Cleveland delivery having disappeared. However, quotations for outside shipments are unchanged at \$12.75 to \$13. Southern iron is inactive and is still to be had at \$9.50, Birmingham, for No. 2, although most producers are asking \$10. We quote delivered, Cleveland, as follows:

Bessemer	\$14.70
Basic	13.45
Northern No. 2 foundry	\$13.25 to 13.50
Southern No. 2 foundry	13.50 to 14.00
Gray forge	13.00
Jackson Co. silvery 8 per cent. silicon	17.62
Standard low phos., Valley furnace	20.00 to 20.25

Coke.—There is little inquiry for foundry coke contracts. Consumers not now under contract are purchasing small lots as needed and sales are limited to these early shipment orders. There is no demand for furnace coke. We quote standard furnace coke at \$1.50 to \$1.60 per net ton at oven for spot shipment and \$1.75 for contracts. The best makes of Connellsville furnace coke are held at \$2.25 to \$2.50 for prompt shipment and contracts.

Finished Iron and Steel.—The current demand has improved considerably and a fair volume of business is being taken at the new prices in spite of the fact that many consumers took advantage of the opportunity to place orders for their early requirements before the price advance. Some consumers are shopping around in the hope of breaking the 1.10c. Pittsburgh price on steel bars, but this price is apparently being firmly maintained on bars and structural material. Desirable orders for plates can still be placed at 1.05c., Pittsburgh, but the larger mills are generally adhering to the 1.10c. price. Considerable inquiry for barbed wire for export is coming out, one of these being for 8000 tons a month while the war lasts, and others for lots ranging from 2000 to 50,000 tons. Not all these inquiries are regarded as bona fide, however. In structural lines the McClintic-Marshall Company has taken 700 tons for a building for the Empire Rolling Mill Company, and bids have been taken for the Jewish Hospital requiring 450 tons. A leading automobile company has contracted for its year's requirements in automobile springs amounting to 10,000 tons. Additional orders for motor trucks for war purposes have come to Cleveland makers, whose plants are crowded to capacity. The sheet mar-

ket is dull and prices are not firm, particularly on galvanized sheets, sales of which are reported for shipment to distant points at as low as 2.65c. at mill for early delivery. In this market prices appear well maintained at 1.80c. at mill for No. 28 black; 2.75c. for No. 28 galvanized; 1.35c. for No. 10 blue annealed. Iron bars are quoted at 1.15c. to 1.20c. for Cleveland delivery, with little demand. Warehouse prices are 1.80c. for steel bars and 1.90c. for plates and structural material.

Bolts, Nuts and Rivets.—Current orders for bolts and nuts have improved considerably but prices continue very weak. Some makers are declining to take orders except for immediate specifications at the prevailing prices. Rivets are slightly firmer as a result of the advance in steel and are generally quoted at 1.40c., Pittsburgh, for structural and 1.50c. for boiler rivets. Regular discounts are as follows: Common carriage bolts $\frac{3}{4}$ x 6 in., smaller or shorter, rolled thread, 80 and 10 and 5 per cent.; cut thread, 80 and 10 per cent.; larger or longer, 75 and 15 per cent.; machine bolts with h. p. nuts, $\frac{3}{4}$ x 4 in., smaller or shorter, rolled thread, 80 and 10 and 10 per cent.; cut thread, 80 and 10 and 5 per cent.; larger or longer, 80 per cent.; coach and lag screws, 80 and 5 per cent.; square h. p. nuts, blank or tapped, \$6.50 off; hexagon h. p. nuts, blank or tapped, \$7.40 off; c. p. c. and t. square nuts, blank or tapped, \$6.20 off; hexagon, $\frac{3}{4}$ in. and larger, \$7.50 off; $\frac{9}{16}$ in. and smaller, \$8 off; semi-finished hexagon nuts, $\frac{3}{4}$ in. and larger, 85, 10 and 10 per cent.; $\frac{9}{16}$ in. and smaller, 85, 10, 10 and 10 per cent.

Old Material.—The market is firmer and prices on several grades have been advanced 25c. to 50c. a ton. Not much new inquiry is coming out, but dealers claim that they could sell a large amount of scrap were they disposed to do so. However, they are afraid to make short sales and both the yard dealers and producers are holding on to their material for better prices. Heavy steel scrap is 25c. a ton higher in Cleveland. In the Valley prices have been advanced 50c. to \$11 to \$11.25. One Youngstown mill is in the market for heavy steel for February delivery. We quote, f.o.b. Cleveland, as follows:

Per Gross Ton	
Old steel rails, rerolling	\$11.00 to \$11.75
Old iron rails	12.00
Steel car axles	12.75 to 13.25
Heavy melting steel	9.50 to 10.00
Old carwheels	10.00 to 10.50
Relaying rails, 50 lb. and over	23.00 to 25.00
Agricultural malleable	8.00 to 8.50
Railroad malleable	9.75 to 10.00
Light bundled sheet scrap	8.00 to 8.50

Per Net Ton	
Iron car axles	\$16.00 to \$16.50
Cast borings	5.75 to 6.25
Iron and steel turnings and drillings ..	5.50 to 5.75
Steel axle turnings	6.00 to 6.25
No. 1 busheling new	8.25 to 8.75
No. 1 busheling old	8.25 to 8.50
No. 1 railroad wrought	9.25 to 9.75
No. 1 cast	10.00 to 10.50
Stove plate	7.50

Cincinnati

CINCINNATI, OHIO, January 13, 1915.—(By Wire.)

Pig Iron.—Some confusion as to the prompt shipment price of Southern iron has resulted because of certain makers quoting \$9.50, Birmingham, on No. 2 and only 25c. per ton less for No. 3, the usual 50c. differential not being observed on the lower grades. While there is considerable talk as to a general advance on Southern iron being contemplated, contracts can be made for more than one brand at \$9.50, with deliveries in some cases to extend through the first half. With the exception of one round lot of Southern No. 3 foundry taken by a nearby concern, there is little to report in the way of new business, although sales are mentioned of odd lots of Southern No. 2 that brought all the way from \$9.50 to \$10, Birmingham basis. The foundry melt is improving steadily, and shipments on old contracts are going forward at a satisfactory rate. There is also said to be a slight improvement in the consumption of basic iron. Northern foundry irons appear to be steady at the scheduled prices. Ohio silvery irons have developed weakness, and several small sales were made last week at \$15.50, furnace, and as low as \$15 has been done on some business this week. These

quotations are based on an 8 per cent. analysis. Malleable continues quiet, with no indications of an early change for the better. Based on freight rates of \$2.90 from Birmingham and \$1.26 from Iron-ton, we quote, f.o.b. Cincinnati, as follows:

Southern coke, No. 1 f'dry and 1 soft.	\$12.90 to \$13.40
Southern coke, No. 2 f'dry and 2 soft.	12.40 to 12.90
Southern coke, No. 3 foundry.	11.90 to 12.40
Southern No. 4 foundry	11.40 to 11.90
Southern gray forge	10.90 to 11.40
Ohio silvery, 8 per cent. silicon.	16.26
Southern Ohio coke, No. 1.	15.01 to 15.51
Southern Ohio coke, No. 2.	14.01 to 14.51
Southern Ohio coke, No. 3.	13.76 to 14.01
Southern Ohio malleable Bessemer.	14.26
Basic, Northern	14.26
Lake Superior charcoal	15.25 to 17.25
Standard Southern carwheel	26.90 to 27.40

(By Mail)

Coke.—There is no improvement in the demand for either furnace or foundry coke. Prices are unchanged.

Finished Material.—A slightly better demand for sheets has developed. Quite a number of inquiries are in hand for future shipment. The mills in this vicinity continue their policy of not quoting present prices for shipment beyond January. No. 28 black sheets are selling at 2c. f.o.b. Cincinnati, or Newport, Ky., and No. 28 galvanized 3c. Structural material is slow, but as the building outlook shows some improvement the spring trade bids fair to be satisfactory. Store prices on steel bars and structural shapes remain around 1.70c. to 1.75c.

Old Material.—A considerably better tone prevails in the market, although the demand from all sources is light. Prices have stiffened about 25c. per ton on practically all grades of scrap. The rolling mills are not doing any large contracting, but they will have to buy to carry them through the first half of the year. The minimum figures given below represent what buyers are willing to pay for delivery in their yards in southern Ohio and Cincinnati, and the maximum quotations are dealers' prices f.o.b. at yards.

Per Gross Ton

Bundled sheet scrap	\$6.50 to \$7.00
Old iron rails	11.25 to 12.25
Relaying rails, 50 lb. and up.	20.00 to 20.50
Rerolling steel rails	10.00 to 10.50
Melting steel rails	9.00 to 9.50
Heavy melting steel scrap	8.75 to 9.25

Per Net Ton

No. 1 railroad wrought.	\$7.75 to \$8.25
Cast borings	4.25 to 7.75
Steel turnings	4.25 to 4.75
Railroad cast scrap	9.50 to 10.00
No. 1 machinery cast scrap.	10.00 to 10.50
Burnt scrap	6.25 to 6.75
Old iron axles	13.75 to 14.25
Locomotive tires (smooth inside).	9.00 to 9.50
Pipes and flues	5.75 to 6.25
Malleable and steel scrap.	7.00 to 7.50
Railroad tank and sheet scrap.	4.75 to 5.25

Buffalo

BUFFALO, N. Y., January 12, 1915.

The report from Buffalo last week was, through a delay in the mails, omitted from the last issue. The quotations for pig iron were, however, unchanged from those published in *The Iron Age* of December 31, which quotations are therefore to be taken as the prices for January 5.

Pig Iron.—Inquiry has been of moderate volume only with a few orders running as high as 300 or 400 tons. Prices at which business has been taken for first quarter average \$13.25 for No. 1 foundry, \$13 for No. 2 and malleable, and \$12.75 for No. 2 plain and lower grades, at furnace. In a few instances these prices have been shaded by some producing interests of the district and some No. 2 X iron is reported placed at \$12.75, but the shading is confined principally to low silicon irons. For second quarter delivery furnacemen are holding quotations at a little higher level. A considerable percentage of the foundries of the tributary district are still shut down to a greater or less extent on account of inventory and repairs, and consequently iron is going forward from furnaces a little less freely; but there has been no pronounced suspension of shipments on contracts. We quote as follows for first quarter delivery, f.o.b. furnace,

with an average of 25c. per ton higher asked for second quarter delivery.

No. 1 foundry	\$13.00 to \$13.25
No. 2 X foundry	12.75 to 13.00
No. 2 plain	12.50 to 12.75
No. 3 foundry	12.50
Gray forge	12.50
Malleable	12.75 to 13.00
Basic	13.25 to 13.50
Charcoal, regular grades and analysis	16.25 to 17.25
Charcoal, special grades and analyses.	20.50

Finished Iron and Steel.—All contracts closed for 1915 business in bars, plates and shapes are on the basis of 1.10c., Pittsburgh, for first quarter, and such contracts as were taken for second quarter were at 1.15c. The total of orders put on the books in December was above the average for that month for the last few years. The price for wire products was advanced \$1 per ton, effective January 9, making the price for annealed wire 1.35c. and for wire nails 1.55c. Bids are being taken for about 500 tons of reinforcing bars for the Eastern Grain Mill and Elevator Corporation, and 500 tons of structural steel for the elevator headhouse. Bids are also being taken for two police stations involving about 200 tons. The Van Dorn Iron Works Company, Cleveland, was low bidder on the structural work for the additions to the Erie County jail.

Old Material.—Demand from Valley points for heavy melting steel, borings and turnings and bundled sheet scrap is good. The principal local consumer of heavy melting steel is not buying at the present time, however, and there has been no advance in price, as had been expected by dealers. There is an inclination on the part of dealers to purchase for stock in anticipation of higher prices. We quote dealers' asking prices per gross ton f.o.b. Buffalo, as follows:

Heavy melting steel	\$9.50 to \$10.00
Low phosphorus steel	12.50 to 13.00
No. 1 railroad wrought scrap.	9.50 to 10.00
No. 1 railroad and machinery cast.	10.00 to 10.50
Old steel axles	11.50 to 12.00
Old iron axles	16.00 to 16.50
Old carwheels	10.00 to 10.50
Railroad malleable	9.00 to 9.50
Machine shop turnings	5.00 to 5.50
Heavy axle turnings	8.00 to 8.50
Clean cast borings	5.50 to 6.25
Old iron rails	10.50 to 11.00
Locomotive grate bars	8.50 to 9.00
Stove plate (net ton)	8.00 to 8.50
Wrought pipe	6.50 to 7.00
Bundled sheet scrap	5.75 to 6.25
No. 1 busheling scrap	7.00 to 7.50
No. 2 busheling scrap	5.00 to 5.25
Bundled tin scrap	10.00

St. Louis

ST. LOUIS, Mo., January 11, 1915.

Pig Iron.—A larger general inquiry and increased spot demand have developed. One sale of 1800 tons of Southern of varying grades is reported and one of 1000 tons and one of 800 tons. The aggregate for the week is probably about 6000 tons.

Coke.—The demand for coke is only in small lots. The contract for 12,000 tons of furnace coke for smelter use is still pending. Prices show no change.

Finished Iron and Steel.—The finished-product market has taken kindly to the stiffening up of prices to the 1.10c., Pittsburgh, basis, buyers stating that they prefer a market with some character rather than uncertainties which have prevailed. Movement out of warehouse is good and the quotations at present are as follows: Soft steel bars, 1.70c.; iron bars, 1.65c.; structural material, 1.80c.; tank plates, 1.80c.; No. 10 blue annealed sheets, 2c.; No. 28 black sheets, cold rolled, 2.55c.; No. 28 galvanized sheets, black sheet gauge, 3.55c.

Old Material.—There is a firmer feeling in spite of heavy offerings from the railroads. Steel mills, foundries, etc., have not begun to increase takings very heavily, but they are larger than they have been. Lists out include 700 tons from the Mobile & Ohio, 1500 tons from the Northern Pacific, 200 tons from a local industry, 700 tons from the G. W. Jennings Company, 2000 tons from the Missouri, Kansas & Texas, 1000 tons from the Vandalia, 3000 tons from the Southern and 500 tons from the Frisco. New inquiry of all kinds is appearing in the market, but rather tentative in character. We quote dealers' prices, f.o.b. St. Louis, as follows:

Per Gross Ton.		
Old iron rails	\$10.00 to	\$10.25
Old steel rails, re-rolling	10.00 to	10.25
Old steel rails, less than 3 feet	10.00 to	10.25
Relaying rails, standard section, subject to inspection	21.00 to	23.00
Old carwheels	10.25 to	10.50
No. 1 railroad heavy melting steel scrap	9.50 to	9.75
Shoveling steel	8.75 to	9.00
Frogs, switches and guards cut apart	9.50 to	9.75
Bundled sheet scrap	5.50 to	6.00

Per Net Ton		
Iron angle bars	\$10.50 to	\$10.75
Steel angle bars	8.75 to	9.00
Iron car axles	15.00 to	15.50
Steel car axles	10.75 to	11.00
Wrought arch bars and transoms	10.75 to	11.25
No. 1 railroad wrought	8.00 to	8.25
No. 2 railroad wrought	7.75 to	8.00
Railroad springs	8.75 to	9.00
Steel couplers and knuckles	8.75 to	9.00
Locomotive tires, 42" and over, smooth	8.75 to	9.00
No. 1 dealers' forge	7.25 to	7.50
Mixed borings	5.00 to	5.25
No. 1 busheling	7.50 to	7.75
No. 1 boilers, cut to sheets and rings	5.50 to	6.00
No. 1 railroad cast scrap	9.50 to	10.00
Stove plate and light cast scrap	7.50 to	8.00
Railroad malleable	7.25 to	7.50
Agricultural malleable	6.50 to	6.75
Pipes and flues	6.00 to	6.25
Railroad sheet and tank scrap	6.00 to	6.25
Railroad grate bars	7.25 to	7.50
Machine shop turnings	5.75 to	6.00

The Ohio Iron & Metal Company, dealer in iron and steel scrap and railroad equipment, with main office at Chicago and branch offices in Pittsburgh and Cleveland, announces the opening of a branch office at St. Louis, Mo. Armand Alexandre, of Chicago, has been appointed district manager of the St. Louis territory, with offices in suite 1218 and 1219 Syndicate Trust Building, St. Louis.

Birmingham

BIRMINGHAM, ALA., January 11, 1915.

Pig Iron.—Sales of pig iron by Alabama makers during the first part of January have been largely in small lots and, while effort is still made to hold for \$10, business is being done on a basis of \$9.50 to \$9.75. The latter price has been secured for small lots in Southern territory. The only sale of any size reported is one of 6000 tons to a Middle West consumer for first half delivery, and it is understood that \$9.50 was the basis. One large interest is said to be holding for \$10, but no sales are reported. In spite of increased shipments, it is believed that stocks on hand are growing, making it a very spotted situation. The home consumption of basic iron is holding up well, the steel mill at Ensley having started Monday on its third consecutive week of operations in all departments. The Frisco, Central of Georgia and other Southern roads are expected to place contracts at an early date for at least a portion of the year's rail supply. It is reported on what appears to be reliable authority that Italy desires 50,000 tons of barb wire and a large quantity of basic iron. Exact information as to foreign orders is difficult to secure on account of the secrecy imposed by war conditions. We quote, per gross ton, f.o.b. Birmingham furnaces, as follows:

No. 1 foundry and soft	\$10.00 to	\$10.25
No. 2 foundry and soft	9.50 to	9.75
No. 3 foundry	9.00 to	9.25
No. 4 foundry	8.75 to	9.00
Gray forge	8.50 to	8.75
Basic	9.50 to	10.00
Charcoal	22.50 to	23.00

Cast-Iron Pipe.—The output of water and gas pipe has increased and the outlook appears to be satisfactory. While quotations have not been upheld on a good portion of the especially desirable business, the shops have made a fair start for the new year. Soil pipe factories are still operating at about 50 per cent. of capacity. We quote, per net ton, f.o.b. pipe shop yards, as follows: 4-in., \$20; 6-in. and upward, \$18, with \$1 added for gas pipe.

Coal and Coke.—Railroad business has picked up to some extent, a greater amount of coal now being used by them. The completion of a new coal tippie at New Orleans by the Illinois Central will serve to increase Alabama's bunker coal trade there. Several satisfactory coke contracts, covering needs of foundries for six

months, have been made, and have given an impetus to the coke business, but not to such an extent as to justify the firing of any of the numerous idle batteries. Prices remain about the same. We quote, per net ton, f.o.b. oven, as follows: Furnace coke, \$2.75 to \$2.90; foundry, \$3.20 to \$3.40.

Old Material.—Dealers report a slight betterment in business, both in actual sales and inquiries, but are proceeding slowly in accumulating stocks. We quote, per gross ton, f.o.b. dealers' yards, as follows:

Old iron axles	\$13.00 to	\$13.50
Old steel axles	12.50 to	13.00
Old iron rails	12.00 to	12.50
No. 1 railroad wrought	8.50 to	9.00
No. 2 railroad wrought	7.50 to	8.00
No. 1 country wrought	8.00 to	8.50
No. 2 country wrought	7.00 to	7.50
No. 1 machinery cast	9.50 to	10.00
No. 1 steel scrap	8.00 to	8.50
Tram carwheels	8.50 to	9.00
Stove plate	8.00 to	8.50

New York

NEW YORK, January 13, 1915.

Pig Iron.—Two inquiries of fair size have appeared in the past week—one from Elizabethport for 2000 tons of foundry iron for shipment over the first half of the year, half of it high silicon and half No. 2 plain iron, and the other from a producer of spiegel whose foundry requirements are 1200 tons a year. This amount is asked for in the pending inquiry. Several lots of 100 tons each are called for in New Jersey business that has come up, but the situation has not developed anything significant in the foundry industry beyond a general acquiescence in the existence of a better feeling. The New England market in particular is quiet. New York buyers for large foundry interests are not likely to come into the market against spring requirements for some weeks. Pipe foundries in the East have taken on some iron recently. The report of a large transaction in low-phosphorus iron has been current, but without authenticated details as to price or tonnage. We quote Northern iron for tidewater delivery as follows: No. 1 foundry, \$14.45 to \$14.95; No. 2 X, \$14.20 to \$14.45; No. 2 plain, \$13.95 to \$14.20. Southern iron is nominally \$14.50 for No. 1 and \$14 to \$14.25 for No. 2.

Ferroalloys.—No developments looking to the lifting of the British embargo on ferromanganese are reported. Representatives here of English producers can obtain no definite information, nor are any shipments reported on the way. This means that receipts here in January will be practically nothing; those for December were very small. No anxiety is expressed by consumers thus far, though late indications are that Great Britain will continue the embargo indefinitely. Inquiries are few and the quotation is still \$68 seaboard, subject to all contingencies as to shipment. Ferrosilicon, 50 per cent., is unchanged, ranging from \$71 to \$73, Pittsburgh.

Finished Iron and Steel.—Events have sustained the expectation of betterment but they do not indicate any decided increase in business for a long time to come. Considerable encouragement is taken in the inquiry of the Pennsylvania Railroad for bridge work to be done in 1915, aggregating 15,000 tons, partly because this is hardly regarded as a necessity in the same way that rails are needed and partly also because there is evidently a belief that at this time the lowest prices of the year will be obtained. This is not saying that the 170,000-ton rail inquiry of the same railroad, 150,000 tons to be bought immediately, is not well received. Generally there has not yet been a railroad response to low prices, and it is doubtful if there are 2000 cars under active figuring at this time, following the week's closure of 2500 cars. The local fabrication outlook is exceedingly discouraging and most of the fabricators have less than one month's work on their books. It is estimated that mills are running at about 40 per cent. capacity and in some cases 25 per cent. of the output is for export. Incidentally there are fresh inquiries for bars for making shrapnel. Prices are well maintained at the 1.10c. Pittsburgh basis for the first quarter. A good many guesses are hazarded as to prices at which recent large sales were effected, indicating a prepon-

derance of belief that they were closed for less than 1.05c. Pittsburgh, in some cases by giving the buyer a freight advantage owing to the mill location. The awards in structural lines totaled about 4000 tons, including 1200 tons for the Murray Hill building at Fifth avenue and Thirty-seventh street, and 500 tons for a department store at Manchester, Mass., both to the Levering & Garrigues Company; 550 tons for the Cape Fear river bridge, Hilton, N. C., to the Virginia Bridge & Iron Works, and 1800 tons for the Townsend & Grace warehouse, Baltimore, a power house for the Victor Talking Machine Company, Camden, N. J., and the substructure for the Detroit Public Library, all to be built by Irwin & Leighton, general contractors, Philadelphia. Besides the Pennsylvania bridge work, which will be bid on by classes of work and which may be distributed among different fabricators, the Lackawanna is in the market for 400 tons covering 1915 bridge requirements. The Fort Pitt Bridge Company is low bidder for the 1500 tons for the coal breaker for the Lehigh & Wilkes-Barre. It is expected that an award will now be made very shortly for the 500 tons for the Lehigh & New England at Pen Argyl. The Pennsylvania Coal Company is in the market for a coal breaker about 1500 tons, and other active structural work includes a Goelet loft, New York, 1000 tons, and the Standard Arcade building, Broadway, 700 tons, which has been revived. In railroad cars the Baltimore & Ohio placed 1000 hoppers with the Cambria Steel Company and 1000 box cars with the Mt. Vernon Car Mfg. Company. The railroad has now definitely decided not to purchase 2000 more cars, which were thought likely. The Mather Stock Car Company has bought 500 cars from the Haskell & Barker Car Company. The Prudential Oil Corporation is in the market for 200 tank cars, has bought 68 tanks involving 780 tons of steel plates for Baltimore, and it is understood will erect a refinery at Baltimore. The Chicago & Milwaukee is in the market for 15 electric passenger cars, and an award in the case of 20 passenger cars for the Long Island is early expected. We quote mill shipments of steel bars, shapes and plates at 1.10c. to 1.15c., Pittsburgh, or 1.26c. to 1.31c., New York, and iron bars at 1.20c. to 1.25c., New York. From store we quote iron and steel bars at 1.30c. to 1.35c., New York, and plates and shapes at 1.35c. to 1.90c.

Old Material.—Apart from some interest shown by foundries in cast scrap, the local markets in old material have been as quiet as for the past month. Steel manufacturers in eastern Pennsylvania are buying nothing, and a deadlock appears to exist, with dealers asking somewhat higher prices and the steel companies naming figures as low as in early December. The market here, however, is influenced by the improved movement at Pittsburgh, as well as by the more encouraging indications as to general business. Quotations are as follows, per gross ton, New York:

Old girder and T rails for melting....	\$7.75 to \$8.00
Heavy melting steel scrap.....	7.75 to 8.00
Relaying rails.....	19.00 to 19.50
Reroiling rails.....	8.50 to 9.00
Iron car axles.....	14.00 to 14.25
Steel car axles.....	10.75 to 11.00
No. 1 railroad wrought.....	9.25 to 9.75
Wrought-iron track scrap.....	8.75 to 9.25
No. 1 yard wrought, long.....	8.75 to 9.25
No. 1 yard wrought, short.....	7.75 to 8.00
Light iron.....	3.50 to 4.00
Cast borings.....	5.50 to 6.00
Wrought turnings.....	5.50 to 6.00
Wrought pipe.....	7.25 to 7.50
Carwheels.....	9.25 to 9.50
No. 1 heavy cast, broken up.....	9.75 to 10.25
Stove plate.....	7.50 to 8.00
Locomotive grate bars.....	6.25 to 6.75
Malleable cast.....	7.00 to 7.50

Cast-Iron Pipe.—Municipal lettings are slow to develop, none of importance being in sight at present. Competition has been sharp on those advertised in the past fortnight. The low bidder on the Boston contract was R. D. Wood & Co., who named \$21.24 on 4-in., \$19.74 on 6 to 10 in. and \$19.24 on 12 to 30 in. The next nearest bidder was very slightly higher. On the purchase made by Medford, Mass., the Standard Cast Iron Pipe & Foundry Company was low bidder, naming \$21.21 on 6 and 8 in. and \$20.70 on 10 and 12 in. The same company was low bidder on the pipe bought by

Northampton, Mass., and its prices were the same as those on the Medford contract. Private buying continues to keep up very well, inquiries steadily coming forward. More foreign business is appearing, and prospects are bright for some of this trade coming to American pipe manufacturers. Prices on carload lots of 6-in. may still be quoted at \$20 to \$20.50 per net ton, tidewater.

British Steel Prices Advancing

High Freights Shut Out American Steel—New Australian Works Books Home Rail Order

LONDON, ENGLAND, January 13, 1915.

The market is very firm because of scarcity of labor and strength of raw materials. Semi-finished steel is strong, but business in American steel is impossible, owing to high freights, 40s. (\$9.73) per ton being asked from northern United States ports to our ports on the Tees. Tin plates are firmer, due to high raw material, but very little is doing and the embargo is still operative. Finished steel is advancing. Queensland has placed 20,000 tons of steel rails with British mills and Denmark 9000 tons with the German Steel Works Union, the latter at £5 7s. 6d. (\$26.16) delivered. A small Australian rail order has been placed with the new Broken Hill Proprietary Steel Works, Newcastle, Australia. Stocks of pig iron in Connal's stores are 112,376 tons against 110,183 tons last week. Active furnaces in the three principal districts are 168 against 161 a year ago. Scotch pig-iron production in 1914 was 1,140,000 tons. We quote as follows:

Tin plates, coke 14 x 20, 112 sheets, 108 lb., f.o.b. Wales, 13s. (\$3.16), against 12s. 7½d. (\$3.07) last week.

Cleveland pig-iron warrants, 54s. 10d. (\$13.34), against 55s. (\$13.39) last week.

No. 3 Cleveland pig iron, makers' price, f.o.b. Middlesbrough, 55s. 6d. (\$13.51).

Steel black sheets, No. 28, export, f.o.b. Liverpool, £8 17s. 6d. (\$43.19).

Steel ship plates, Scotch, delivered local yards, £7 5s. (\$35.28).

Steel rails, export, f.o.b. works port, £6 7s. 6d. (\$31.02).

Hematite pig iron, f.o.b. Tees, 80s. (\$19.47), against 72s. 6d. (\$17.64) last week. Furnaces may be obliged to stop, owing to the impossibility of getting ore.

Sheet bars (Welsh), delivered at works in Swansea Valley, £5 7s. 6d. (\$26.15), against 100s. (\$24.33) last week.

Steel joists, 15 in., export, f.o.b. Hull or Grimsby, £7 10s. (\$36.49), against £6 17s. 6d. (\$33.44) last week.

Steel bars, export, f.o.b. Clyde, £7 12s. 6d. (\$37.10), against £7 5s. (\$35.28) last week.

Ore Position Tight—French Structural Orders—Low German Price for Norwegian Rails

(By Mail)

LONDON, December 24, 1914.—The pig-iron make is considerably reduced and it is not much use looking for any material expansion for a long time to come, for labor is excessively scarce, and all kinds of raw materials are dear. The ore position, to which attention has already been directed upon several occasions, is very tight, and it is almost impossible to book steamers to carry material from Spain and elsewhere. Shipowners are reaping huge fortunes owing to the boom in freights which is the direct result of so many vessels being chartered by the Government, and there is not the least sign of any abatement of the scarcity of tonnage for months to come. The war will have to be in its final stages ere many vessels are released. It is not permitted to ship iron from the Tees to Scotland by water, and to this extent, therefore, the consumption of Cleveland metal is hampered, but the clearances by rail are going on steadily.

The markets for all iron and steel products are firm but without any fresh features of moment. The cable

has informed you of the fact that the French railroad, affected by the German invasion, has commenced ordering steel work to repair the damage done, and that there is also a big demand developing for structural steel. Some of this has been placed with English bridge builders, but reports, which it has not been possible to confirm here, assert that large orders have also gone to the United States. Your steel men should prepare themselves for a demand for steel and all steel products on a larger scale than anything ever witnessed in history. When the time will be here for general buying to replace the wanton damage done, is the only question.

The German Steel Works Union took the Norwegian order for steel rails at an extremely low price, equal to about £5 6d. (\$25.79) a ton, f.o.b. British makers want at least £1 (\$4.86) more than this.

Boston

BOSTON, MASS., January 12, 1915.

Old Material.—While dealers believe the tide has turned their way, the steel mills have not increased their buying. Prices are unchanged. The quotations given below are based on prices offered by the large dealers to the producers and to the small dealers and collectors, per gross ton, carload lots, f.o.b. Boston and other New England points which take Boston rates from eastern Pennsylvania points. Mill prices are approximately 50c. per ton higher.

Heavy melting steel	\$8.25 to	\$8.50
Low phosphorus steel	13.75 to	14.75
Old steel axles	12.75 to	13.25
Old iron axles	20.25 to	20.75
Mixed shafting	12.00 to	12.25
No. 1 wrought and soft steel	8.25 to	8.75
Skeleton (bundled)	5.50 to	5.75
Wrought-iron pipe	7.00 to	7.50
Cotton ties (bundled)	5.25 to	5.75
No. 2 light	3.25 to	3.75
Wrought turnings	5.00 to	5.50
Cast borings	5.00 to	5.25
Machinery cast	10.75 to	11.00
Malleable	7.50 to	7.75
Stove plate	7.00 to	7.50
Grate bars	5.25 to	5.50

Metal Market

NEW YORK, January 13, 1915.

The Week's Prices

Cents Per Pound for Early Delivery							
Copper, New York		—Lead—		—Spelter—			
Jan.	Lake	Electro-lytic	Tin, New York	New Lork	St. Louis	New York	St. Louis
6.....	13.50	13.25	33.37½	3.80	3.60	5.85	5.70
7.....	13.50	13.37½	33.85	3.80	3.60	5.90	5.75
8.....	13.50	13.37½	33.37½	3.80	3.60	5.95	5.80
9.....	13.50	13.37½	33.62½	3.80	3.60	5.95	5.80
11.....	13.62½	13.50	33.75	3.70	3.50	6.00	5.85
12.....	13.75	13.62½	33.35	3.70	3.50	6.05	5.90

Copper has advanced because of the strength in Europe. Tin is a little higher though trading is quiet. Lead is reduced 10c. per 100 lb. Both spelter and antimony are higher in response to foreign demand.

New York

Copper.—Business has not been good on domestic account, except where demand has come from the makers of ammunition who are manufacturing for export. Nevertheless, the market is considerably stronger in reflection of the greater strength which exists in the European market. Second-hand lots are no longer being offered at concessions, and a producer's market again prevails. There are reports that good business has been done with Europe, but this is doubted in some quarters because of the excess of metal which is unabsorbed in this market, although it must be admitted that the finding of cargo space is not easy and European buyers may be looking ahead. Some brands of Lake are commanding a large premium. The quotation for electrolytic yesterday was 13.62½c. and for Lake, 13.75c.

Tin.—Transactions have been light, although in the latter part of last week there were comparatively good inquiries for futures, but sellers were unwilling to grant the concessions which consumers wanted. A few holders of spot metal released their holdings at about 32.85c. on Thursday last, but prices subsequently became firmer.

The market showed a little more life yesterday, when spot sold at 33.35c. and there was some request for futures. Between 100 and 150 tons was sold yesterday, which was a vast improvement in activity as compared with previous conditions. The arrivals of this month are larger than those of December, 730 tons being the total for January. The quantity afloat is reported at 3640 tons.

Lead.—The important feature of a dull market was the action of the American Smelting & Refining Company in reducing its New York quotation to 3.70c., a reduction of \$2 a ton, on January 11. The reduced price would be considered most surprising were it not for the recent statistics showing that production had increased about 100,000 tons in 1914. These figures explain the downward course of lead in recent months and indicate that what strength the market had was almost entirely imparted by foreign demand. The St. Louis quotation is 3.50c.

Spelter.—Sales for export have greatly strengthened the market. The New York quotation yesterday was 6.05c. and that at St. Louis, 5.90c. Consumers here, except in the case of the brass mills, have held back in purchasing. Brass mills special spelter is commanding a premium of about 1c. per lb., sales having been made at 7c. The London quotation has been advancing steadily, the quotation for spot yesterday being £29 (\$141.13). Foreign stocks are small and importation is difficult.

Antimony.—Continued foreign inquiry, particularly on the part of Russia, has sent the market up. Cookson's is quoted at 16c. to 16½c.; Hallett's at 15c. to 15½c., and Chinese at 14c. to 14½c. A belief that the metal is in a strong position has led to considerable trading between brokers and this also has helped to advance prices.

Old Metals.—The market is strong and prices are higher. Dealers' selling prices are as follows:

	Cents per lb.
Copper, heavy and crucible.....	12.75 to 13.00
Copper, heavy and wire.....	12.25 to 12.50
Copper, light and bottoms.....	11.25 to 11.50
Brass, heavy	9.00 to 9.25
Brass, light	7.25 to 7.50
Heavy machine composition.....	11.25 to 11.50
Clean brass turnings	8.50 to 8.75
Composition turnings	9.75 to 10.00
Lead, heavy	3.45
Lead, tea	3.20
Zinc, scrap	4.50

Chicago

JANUARY 11.—Domestic buyers of copper have been entering the market liberally and the price of the metal reflects the strengthened position. Spelter prices experienced a sharp advance without any very clear explanation, the market being largely in doubt as to actual supplies of spelter in stock in this country. Quotations are as follows: Casting copper 13.25c. to 13.50c.; Lake copper, 13.50c. to 13.75c., for prompt shipment; small lots, ¼c. to ½c. higher; pig tin, carloads, 34.50c.; small lots, 37.50c.; lead, desilverized, 3.67½c. to 3.72½c., and corroding, 4c., for 50-ton lots; in carloads, 2½c. per 100 lb. higher; spelter, 5.90c.; sheet zinc, 8.75c.; Cookson's antimony, 18c. to 20c., for cask lots; other grades, 15c. to 16c. On old metals we quote buying prices for less than carload lots as follows: Copper wire, crucible shapes, 10.50c.; copper bottoms, 9c.; copper clips, 10c.; red brass, 9.50c.; yellow brass, 7c.; lead pipe, 3c.; zinc, 3.50c.; pewter, No. 1, 24c.; tinfoil, 28c.; block tin pipe, 30c.

St. Louis

JANUARY 11.—The metal market has been firm, and spelter has been notably strong. Lead closed the week at 3.60c.; spelter, 5.75c. to 5.80c.; tin, 35.50c.; Cookson's antimony, 16c.; lake copper, 13¾c.; electrolytic copper, 13.62½c. In the Joplin ore district there was a further advance on 60 per cent. zinc blende, now \$50 to \$53 per ton, with the choicest as high as \$56. Calamine was also stronger, with 40 per cent. at \$22 to \$24, and top settlement prices as high as \$30 and some small lots at \$31. Lead ore was firm at \$47 for 80 per cent. Miscellaneous scrap metals are quoted as follows: Light brass, 5c.; heavy yellow brass, 7c.; heavy red brass and light copper, 8c.; heavy copper and copper wire, 9c.; tinfoil, 25c.; pewter, 20c.; tea lead, 3c.; zinc, 3c.; lead, 3c.

Iron and Industrial Stocks

NEW YORK, January 13, 1915.

Continued strength has characterized the course of the stock market. The steel company stocks and railroad equipment stocks were noteworthy in advances made. Probably the most interesting occurrence of the week was the sharp rise in the Bethlehem stocks, which attained the highest price in their history. Bethlehem common has at last sold higher than United States Steel. A remarkable exception to the general course of prices was shown in Rumely common, which declined sharply. The range of prices in active iron and industrial stocks from Wednesday of last week to Tuesday of this week was as follows:

Allis-Chal., com..	7% - 8%	Pressed St'l, com.	34 - 39
Allis-Chal., pref.....	35	Pressed St'l, pref.100	-101 1/2
Am. Can., com...	26 1/2 - 30 1/2	Ry. Spring, com...	22 1/2 - 25 1/2
Am. Can., pref...	91% - 94%	Ry. Spring, pref.....	88
Am. Car & Fdry.,		Republic, com...	19% - 20 3/4
com.....	45 - 47%	Republic, pref...	75 - 76 3/4
Am. Car & Fdry.,		Rumely Co., com.	1% - 3 3/8
pref.....	113 1/4	Rumely Co., pref.....	16
Am. Loco., com...	24 - 28 3/4	Sloss, com.....	24 - 27
Am. Loco., pref.....	96 1/4	Pipe, com.....	8 - 9 1/4
Am. Steel F'dries	26 1/2 - 31 1/2	U. S. Steel, com...	50 1/4 - 52 1/4
Bald. Loco., com...	39 3/4 - 40	U. S. Steel, pref...	105 3/8 - 108 1/2
Bald. Loco., pref.102	-103	West'gh'se Elec...	69 - 74
Beth. Steel, com.	48 - 53 3/4	Chic. Pneu. Tool.	51 - 53
Beth. Steel, pref.	93 1/2 - 97 1/2	Cambria Steel...	44 - 45
Colorado Fuel...	22% - 26	Pa. Steel, pref...	60 - 63
General Electric.	140 - 144 3/4	Warwick	10
Gt. N. Ore Cert...	26 1/2 - 28 3/4	Cruc. Steel, com.	12% - 14 1/4
Int. Harv., com...	94% - 99%	Cruc. Steel, pref...	75 - 80 1/2
Int. Harv., new...	116 1/4 - 117	Harb. Wk. Ref., com...	48
Int. Harv. Corp.	73 - 73 1/4	Harb. Wk. Ref.,	
Lackawanna Steel...	28	pref.....	98% - 99
Nat. Enam. & St.,		La Belle Iron,	
com.....	10 - 10 1/4	pref.....	107% - 108 1/4

Dividends

The American Rolling Mill Company, regularly quarterly, 2 per cent. on the common stock and 1 1/2 per cent. on the preferred stock, payable January 15.

The Harbison-Walker Refractories Company, regular quarterly 1 1/2 per cent. on the preferred stock, payable January 20.

The International Nickel Company, regular quarterly, 1 1/2 per cent. on the preferred stock, payable February 1.

The National Fireproofing Company, regular quarterly, 1 per cent. on the preferred stock, payable January 15.

The Torrington Company, 4 per cent. on the common stock, payable February 1.

The Dominion Steel Corporation, Ltd., regular quarterly, 1 1/2 per cent. on the preferred stock, payable February 1.

The Dominion Coal Company, 3 1/2 per cent. on the preferred stock, payable February 1.

An Engineering Foundation

An engineering foundation has been established. The basis is a "gift of a considerable sum by a noted engineer" for advancing the arts and sciences connected with engineering and the benefit of mankind. The board of trustees of the United Engineering Society has been made the custodian of the fund. Inaugural ceremonies are to be held in the Engineering Societies' Building, New York, January 27, and Capt. Robert W. Hunt and Dr. Henry S. Pritchett will be among the three or four speakers.

It is reported that the French iron mines in the districts of Briey and Longwy, recently placed under German military control, are being pumped out and again operated. The moderate production as well as the stocks found there are being placed at the disposal of the German iron trade. Low railroad rates facilitate transportation to over 100 German blast furnaces.

The Ayer & Lord Tie Company, Railway Exchange, Chicago, has received an order for 3500 yd. of wood block flooring to go into the new building the Reo Motor Company, Lansing, Mich., is adding to its manufacturing plant.

Grammes & Sons Establish Works Library

L. F. Grammes & Sons, manufacturers of advertising novelties, Allentown, Pa., celebrated the opening of their employees' free library on the evening of December 30 with a banquet to their 400 employees, which was held in their large office and factory building. After the dinner an interesting address was made by Harry A. Grammes on "Room at the Top," in which he impressed upon his hearers that the only road to advancement is to do their work so well that they are always ahead of their jobs. He said that the workman who wants to progress will always find time to read the leading books and trade papers in his line, as nobody can have too much information about his kind of work. Erwin W. Herring, who assisted in compiling the library, told its history and its aims. Dr. G. T. Ettinger, president of the Allentown Public Library, commended the work of the firm.

The library is arranged in bookcases extending the length of the reception hall and is in charge of a special librarian. It contains 1985 books, of which 500 are for the office force, 500 for the mechanical department and 800 can be used by either. It has been established at a cost of about \$5000. The firm does its business largely by mail orders and the books on letter writing are very complete. The library also contains books dealing with export matters, as the firm is developing a large business of this character. The firm further contemplates the starting of apprentice and evening classes.

The business was founded by the late Lewis F. Grammes, who started with George L. Knauss in 1875. They were expert machinists, and in the early days of the establishment built tower clocks. Mr. Grammes was an inventor and brought out a number of devices which have had wide use.

A Two and Four Cycle Gasoline Engine

The Hoopeston Gas Engine Company, Hoopeston, Ill., is building a gasoline engine embodying a number of interesting features: one is an electric governor to maintain the speed instead of a flyball governor; another is that the engine is started as a two-cycle engine and is afterward changed over to a four-cycle unit automatically. It is pointed out the engine is thus easily started, having an explosion for every revolution until the desired speed is obtained. Then the engine operates on the four-cycle principle. The engine can be run in either direction. A number of different sizes are built from 2 up to 20 hp. for mounting on skids or a truck, with either tank or hopper cooling.

In *The Iron Age* of December 31, 1914, in describing what are called Sentinel pyrometers, mixtures of metallic salts cast into solid cylinders 7/16 in. in diameter and 3/4 in. long, a typographical error resulted in a misstatement of the range of melting points within which these cylinders are obtainable. The range is 220 to 1330 deg. C., each cylinder wrapped in a paper on which is printed the temperature at which it will melt. The salts, which can be obtained in the paste as well as solid form, are intended for use in place of other forms of pyrometer or for checking their accuracy, and are compounded by the Carl Nehls Alloy Company, Brush street, Detroit, Mich.

The Empire Rolling Mill Company, Cleveland, Ohio, has placed the most important contracts in connection with the erection of its new sheet mill plant. The McClintic-Marshall Company, Pittsburgh, was given the contract for the building and the Mesta Machine Company, Pittsburgh, the contract for the mills and drive. The mill equipment will include six finishing mills and four stands of cold rolls, all to be electrically driven.

The Triumph Ice Machine Company, Cincinnati, Ohio, has made public a remarkable long list of its recent sales. The orders came from all parts of the United States and Canada and from two buyers in South Africa and one in Australia, covering a great variety of ice-making and other refrigerating apparatus.

The Canadian Steel Trade in 1914

J. H. Plummer, president of the Dominion Iron & Steel Corporation, Sydney, Nova Scotia, writes of the Canadian iron and steel trade in 1914 in the Toronto Globe's financial survey of the year. He says that the falling off in the industry last year was not in any great measure attributable to the war, though he believes the depression would have been nearly over by this time but for the war. The prostration of business due to the sudden cutting off of the British supply of capital for Canadian railroads was a surprise, Mr. Plummer says, and it is now impossible for any one to make a forecast. Estimating for the last two weeks of the year, he puts the production of pig iron in 1914 at 601,575 gross tons, against 898,138 tons in 1913, and that of steel ingots at 729,697 tons, against 1,048,538 tons in 1913. The falling off in the manufacture of pig iron did not materially decrease the output of coal in Nova Scotia, an outlet being found elsewhere for most of the surplus. It is stated that the revival of any wide demand from Canadian railroads is not in sight, though some increase in their requirements is inevitable before long. Rail business will probably be quiet for a considerable time. On the outlook Mr. Plummer says:

"The plants so situated, geographically, that they can enter into export trade will get an outlet in that direction for fair tonnage but at prices which yield little margin. The condition of the steel trade in the United States, which must in the nature of things affect us greatly, is now more promising. Prices have apparently reached the bottom and may from now on be expected to advance, but we need not count for much early relief in this direction; the prices made by American manufacturers to Canadian customers are always the last to be put up."

British Steel Output, First Half of 1914

The production of open-hearth steel ingots in Great Britain for the first half of 1914, according to the statistics of the British Iron Trade Association as published by the London Iron and Coal Trades Review, was 2,998,487 tons, made up of 1,815,371 tons of acid and 1,183,117 tons of basic steel. This compares with 3,205,983 tons (2,094,130 tons of acid and 1,111,853 tons of basic) in the first half of 1913, showing a falling off of 207,496 tons. The Cleveland district leads, with a production of 840,165 tons of ingots, with North and South Wales next with 777,491 tons, followed by Scotland with 650,492 tons. The output of Bessemer ingots to July 1, 1914, was 654,632 tons—414,875 tons of acid and 239,757 tons of basic steel. The corresponding figures for the first six months of 1913 were 888,526 tons (594,230 tons acid and 294,296 tons basic) or a decrease of 233,894 tons for the 1914 period.

The production of manufactured steel products in the first half of 1914 was 546,826 tons in Bessemer and 2,422,126 tons in open-hearth steel. These figures include forgings and castings made by producers of steel ingots.

Record Exports of Zinc

Exceeding all previous records, the exports of zinc from the United States for the three months ending with November, 1914, amounted to 65,504,574 lb., valued at about \$4,500,000. This compares with 1,346,877 lb., valued at about \$75,000, in the corresponding period in 1913. In the last four fiscal years zinc exports have averaged 12,800,000 lb. per year. The total for 1897, the previous high record year, was 35,869,987 lb. September alone last year surpasses this 1897 total by 2,220,157 lb., being credited with exports of 38,090,144 lb. of zinc pigs, ingots, etc. Of this England took 28,000,000 lb. and Scotland and France 3,000,000 lb. each.

The Cleveland Axle Mfg. Company, Canton, Ohio, has received an order for 7500 axles for export for motor trucks to be used for war purposes. It is stated that the contract will amount to about \$200,000.

German Iron and Metal Trades

Demand for Siegerland ore is more active, due to the gradual blowing in of additional furnaces and the necessity of pig-iron makers to use domestic ores. Nassau ore, raised 36c. per ton at the outbreak of the war, has now been increased again by 36c., so that it costs \$40.15 per 10-ton truck at the mines.

Deliveries of the Pig Iron Syndicate in November, 1914, amounted to 54.4 per cent. of the allotments against 49.09 in October and 81.57 per cent. in November, 1913.

Deliveries of the German Steel Works Union last November were 246,088 metric tons, against 280,570 tons the previous month, and 462,195 tons in November, 1913. All three classes—semi-finished, railroad material and shapes—showed a decline from October.

Syndication of the producers of B products (raw steel) is to be tried again in connection with the January meeting of the Steel Works Union.

Twenty leading producers of superior qualities of steel have formed a syndicate called the Union of German Special Steel Works of Düsseldorf (Vereinigung Deutscher Edelstahlwerke) for the protection of these special branches of the industry.

Basic steel bars have been advanced 48c. to \$25.55 to \$25.79, and are in active demand for military purposes. Plate orders have also improved, with prices averaging \$26.28 to \$26.76. In light sheets orders from neutral countries are plentiful. Common sheets are quoted at \$31.63 for the domestic market with special qualities selling at \$34.06. Wire rods are \$26.28 to \$26.76, the demand being unsatisfactory, especially for army purposes.

The syndicate of zinc sheet rolling mills has advanced prices 24c. to \$7.18 per cwt., or \$146.48 per metric ton for large lots. The syndicate of makers of galvanized iron sheet products has raised its prices 7½ to 10 per cent. because of dearer spelter.

Active demand for bar iron is reported at \$25.30 to \$25.79, delivered at Oberhausen or Dortmund.

The coal syndicate has resumed its export bounty, suspended when war broke out, of 24c. per ton on all syndicate coal used in German iron works to produce materials for export.

German Pig-Iron and Steel Output Increasing

Statistics of the production of pig iron and steel in Germany for the month of October were recently published in Stahl und Eisen as furnished by the German Iron and Steel Association. Figures for November are given in Commerce Reports for January 9 in a cablegram to Washington from the American Consul General in Berlin. Collecting these data and using the figures for July as fairly representative of the monthly production before the war, the following table presents the output for four months of the war and for the 11 months of 1914 to December 1:

	Pig iron, metric tons	Steel ingots and castings, metric tons
July	1,564,345	1,627,345
August	586,661	566,822
September	580,087	663,223
October	729,841	900,201
November	788,956	900,026
The pig iron total for the 11 months of 1914 is 13,535,685 tons, against 17,697,922 tons to November 30, 1913. Steel ingot production to November 30, 1914, was 14,023,713 tons.		

The progressive improvement in the production of both pig iron and steel is evident from the figures for October and November as compared with those for August and September. If the production of pig iron in December was up to the rate of October and November, the total for 1914 was close to 14,200,000 tons. In 1913 it was 19,309,000 tons.

The Berlin, Ont., branch of the Buffalo Forge Company has received an order for 5000 18-in. shells for the Russian Government. This order will compel the company to make large additions to its plant, and three shifts of men will be necessary. When this order is filled it is likely the company will receive another for 15,000 shells.

PERSONAL

Kurt Huessener, managing director of Power Gas Economy, Ltd., London, England, has recently come to the United States and has opened an office at 54 Lafayette street, New York. He is the son of the late Albert Huessener, the well-known pioneer in by-product coke oven work. His firm, Power Gas Economy, Ltd., designs and supplies plants for the economical use of gas under boilers, its chief appliance being the Huessener-Terbeck gas furnace. The firm has also brought out the Huessener-Terbeck coke breeze furnace. Mr. Huessener plans, in addition to the above work, to do general consulting in connection with coke ovens and gas cleaning and by-product recovery plants.

F. O. Wolf, whose present address is 353 West Fifty-eighth street, New York, has come to this country in the interest of a large European house to study the iron and hardware markets.

Edwin B. Wilkinson has been appointed general sales agent for E. N. Breitung & Co., Lake Superior iron ore, Cleveland, Ohio. He was formerly in charge of the blast furnace department of the Pittsburgh Crucible Steel Company, Midland, Pa.

Frank L. Herzog has resigned his position with the Youngstown Sheet & Tube Company, Youngstown, Ohio, to resume connection with the United Engineering & Foundry Company, Pittsburgh, as a designer of rolling mill machinery.

Henry M. Lucas, Lucas Machine Tool Company, Cleveland; R. E. Flanders, Jones & Lamson Machine Company, Springfield, Vt., and H. P. Fairfield, Worcester Polytechnic Institute, Worcester, Mass., have been appointed members of the committee on machine shop practice of the American Society of Mechanical Engineers.

John H. Cavendar, for many years with the American Refractories Company, Chicago, has resigned to become vice-president and director of the Chicago Retort & Fire Brick Company, Chicago. He will take up his new work January 15.

L. M. Waite, Fitchburg Machine Works, Fitchburg, Mass., has returned from England, where he went on business three weeks ago.

Charles L. Benjamin, for eight years advertising manager of the Cutler-Hammer Mfg. Company, Milwaukee, Wis., electric controlling devices, has acquired an important financial interest in Klau, Van Pieterse & Dunlap, Inc., one of the largest advertising agencies in Milwaukee, and will take an active part in the work of the organization, with special reference to technical and trade press advertising, in which field he is nationally known.

George P. Du Bose has been appointed superintendent of the Stockton plant of the Holt Mfg. Company, Stockton, Cal., manufacturer of caterpillar tractors and harvesters. He had been with the company but a short time, in charge of constructing exhibition machines for the two 1915 expositions, but the ability shown here and his record elsewhere made him a choice for the position. Since the retirement of George W. Haines from active work several years ago, no general superintendent had been appointed, and the selection of Mr. Du Bose came after a careful canvass of available men in various parts of the country. After the San Francisco fire he took an active part in the rebuilding of the city, acting as superintendent of construction for D. H. Burnham & Co. and the Thompson-Starrett Company. As general superintendent of bridge construction for the Western Pacific Railway, he built most of the bridges in Nevada and upper California. Previous to his construction work he had a variety of experience in modern shops, all of which will be applied to the Holt plant as occasion arises.

R. M. Nicholson, formerly with the Kramer-Crasselt Advertising Agency, Milwaukee, Wis., and later advertising manager of the Neenah Paper Company, Neenah,

Wis., has been appointed advertising manager of the Berger Mfg. Company, Canton, Ohio. Raymond L. Kreighbaum, who has been filling that position temporarily, has returned to his former position as promoter of sales.

William C. Reitz, who has been acting as treasurer of the Pittsburgh Steel Company and the Pittsburgh Steel Products Company, has resigned as treasurer of the former company and will devote his entire time to the business of the Pittsburgh Steel Products Company. He has also been elected secretary of that company. Mr. Reitz has been succeeded as treasurer of the Pittsburgh Steel Company by David P. Bennett, formerly of New York. Mr. Bennett, until recently vice-president of the National Railways of Mexico, also becomes second vice-president of the Pittsburgh Steel Company, succeeding Willis F. McCook, of Pittsburgh.

Samuel Hale has resigned as general manager of the Algoma Steel Company, Ltd., Sault Ste. Marie, Ontario. There has been no appointment of a successor.

Ralph P. Zint, for the past seven years district sales manager for the Republic Iron & Steel Company at Chicago, and who resigned January 1, will engage in business at Chicago.

Burton L. Verner, for the past two years associated with the U. S. Metal & Mfg. Company at Chicago, is again at the Blue Island mill of the Highland Iron & Steel Company, having been appointed sales manager, for that plant, effective January 1.

Virgil G. Marani and J. E. A. Moore, Cleveland, Ohio, have formed a partnership as consulting civil and mechanical engineers, with offices at 1900 Euclid avenue. Mr. Marani was formerly chief engineer of the Cleveland Gas Light & Coke Company and later building inspector in Cleveland. Mr. Moore was formerly with the Wellman-Seaver-Morgan Company, later in partnership with the late J. W. Seaver, engineer, and more recently chief engineer of the C. O. Bartlett & Snow Company, Cleveland.

W. L. Kerlin, president Boulevard Machine Company, New York, sailed for Europe on a business trip January 13.

W. B. Topping, who has been manager of sales of the Philadelphia office of the Republic Iron & Steel Company, and who has been assigned to a similar position at Cleveland, Ohio, was tendered a farewell luncheon at the Manufacturers' Club, Philadelphia, January 12, by a number of his friends in the iron and steel trade. He was also presented with a testimonial as evidence of the regard in which he is held. The friends present were W. H. Oliver, now manager of the Philadelphia office of the Republic Iron & Steel Company; N. F. S. Russel, W. L. Hoffman, C. E. Bertie, G. R. Sullivan, H. H. Roberts, B. C. Swinehart, William Breeden, J. E. Morgan, H. C. Du Bois and C. H. Newcomb.

American Erectors Association Organized

The American Erectors Association, composed of structural and plate iron fabricators who specialize on tank work, has been organized for the purpose of inaugurating an open shop policy on all field and erection work. The following companies are members: Standard Plate, Iron & Boiler Works, Niles, Ohio; Riter-Conley Mfg. Company, Pittsburgh; Warren City Tank & Boiler Company, Warren, Ohio; Petroleum Iron Works, Sharon, Pa.; Reeves Brothers, Alliance, Ohio; Treadwell Construction Company, Midland, Pa., and Hammond Iron Works, Warren, Pa.

The organization was formed to meet labor conditions, which for several years have been gradually becoming a burden. It is claimed that restrictions of the amount of output constituting a day's work according to union rules can no longer be met. The trouble originated in tank erection work in Oklahoma oil fields.

The new organization will not change its plans in regard to work now under way, but all new erection work will be done under the open shop plan. Union labor will not be discriminated against, but on no job in the future will those employed be restricted to union men.

OBITUARY

Charles S. Price

Charles S. Price, former president of the Cambria Steel Company, died at his home in Westmont, near Johnstown, Pa., January 10, from heart failure. He had not been in good health for some time, but had been confined to his room for only a few days.

Mr. Price presents another example of those who have begun in a subordinate position in a large establishment and by merit and persistent attention to details have risen to supreme control. He was born in West Chester, Pa., August 27, 1852, began his education in private schools and was graduated from Cornell University in 1872 as bachelor of civil engineering. Immediately after his graduation he secured employment as draftsman with the Detroit Bridge & Iron Works, Detroit, Mich. Not long after he was elected city engineer of Lock Haven, Pa., and served in that position for three years. In June, 1876, he entered the service of the Cambria Iron Company, now Cambria Steel Company, as draftsman in the engineering department. In this connection he supervised the construction of the first open-hearth steel plant of the company, and after its completion became foreman of one turn of the plant, in which position he served from 1878 to 1881. As foreman he was obliged to work alternate weeks day and night. He was then promoted to the position of superintendent of the open-hearth steel works and served in that capacity from July, 1881, to May, 1884, when he was made superintendent of the Bessemer steel, open-hearth steel and blooming departments.

On the organization of the metallurgical department of the company in January, 1886, Mr. Price was placed in charge of the Bessemer and open-hearth steel works, blast furnaces and rolling mills. While he was occupying this position the great Johnstown flood of 1889 occurred, and in the exacting experience following that calamity, important parts of the company's plant having been destroyed, Mr. Price rendered conspicuously efficient service. This brought him prominently forward in the estimation of the directors of the company, and in October, 1890, he was made general superintendent of manufacture, from which he was advanced to the office of general manager in March, 1892. He filled this position most creditably, and on March 17, 1910, he was elected president, succeeding Powell Stackhouse. He held this office until 1912, when failing health caused his retirement, and on September 26 in that year he was succeeded as president by William H. Donner.

Mr. Price was an officer of the Johnstown Water Company, Johnstown Gas Company and Citizens' Light, Heat & Power Company, was one of the incorporators of the Conemaugh Valley Memorial Hospital Association, and was connected with various charitable organizations. He leaves his widow, a son and a daughter.

BARTON SEWELL, president Braden Copper Company and vice-president American Smelting & Refining Company, died January 7 at his home in New York City after an illness of seven months, aged 67 years. He was a veteran of the Civil War. When a boy of 15 he enlisted as a drummer under General Grant and saw service in the campaign along the Mississippi River. He became prominent in the mining and smelting in-

dustry, and before the formation of the American Smelting & Refining Company, had been president of the National Smelting & Refining Company, Chicago, and general manager of the United Smelting & Refining Company of Montana. He was one of the organizers of the American Smelting & Refining Company. He also took a leading part in the development of the lead industry, and was the first president of the United Lead Company, and was still interested in lead and also zinc properties at the time of his death, being a director of the United States Zinc Company. He leaves his widow and two sons.

MINOT C. KELLOGG, president of Patterson Brothers, hardware dealers, 27 Park Row, New York, and associated with that firm for 60 years, died at his home in Mount Vernon, January 8, aged 80 years. He was born in New Canaan, Conn., and had been a resident of Mount Vernon for many years. Mr. Kellogg was president of the board of trustees of the First Methodist Episcopal Church of that place and vice-president of the Eastchester Savings Bank. He leaves two daughters.

THOMAS T. JOHNSON, Memphis, Tenn., local representative of the Pittsburgh Steel Company, died recently after a short illness. He was a graduate of Cornell University, and had been in charge of the Memphis office of the company for 12 years. He leaves his widow and a daughter.

JACOB MAY, president and founder of the Eagle Iron Works, Brooklyn, N. Y., died suddenly January 12 from heart disease. Born and educated in Germany, he came to America in 1868 and for several years was employed by the Singer Sewing Machine Company. He rose to the position of superintendent of one of the departments and left the company in 1871, when he established the Eagle Iron Works in the basement of a small building in Brooklyn. The plant is now one of the largest of its kind in the city. Mr. May was interested in charities and civic affairs,

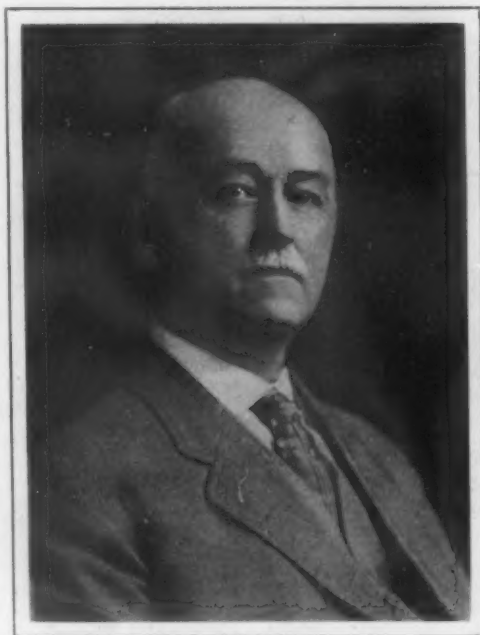
and took a large part in having the city open up several small parks in Brooklyn. The nomination for mayor of the old city of Brooklyn was twice tendered him. He leaves four sons and three daughters.

Special Machines Wanted

Before the war the Tropenas Converter Company, 50 Church street, New York, placed orders with the Chemnitz Werkzeugmaschinenfabrik vorm. J. Zimmermann, for two gear-cutting machines, the specifications of which follow: 1.—One electrically-driven (without motor) spur, helical, spiral and spherical gear-cutting machine to cut gears up to 1100 m/m diameter and face up to 300 m/m. Pitch down to 13. 2.—One electrically-driven (without motor) bevel gear-cutting machine, cutting at one time the two faces of one tooth, cut gears up to 500 m/m diameter and up to 150 m/m face. Pitch down to 15.

The company also placed an order with Wagner & Co., Werkzeugmaschinenfabrik of Dortmund, for a combination planing and milling machine as follows: Electrically-driven (without motor) planer and milling machine equipped with four planing heads and one milling head. Length to be planed, 12,300 m/m; width to be planed, 3550 m/m; height to be planed, 3550 m/m. Width of table to be no less than 3100 m/m.

The machines cannot be delivered because of the war, and the Tropenas Converter Company is desirous of learning if similar machines can be procured here.



CHARLES S. PRICE

Locomotive and Car Construction in 1914 Philadelphia Foundrymen's Association

The total of locomotives built in 1914 in the United States and Canada, according to the Railway Age Gazette, was 1265, or the lowest number in any year since 1897, when the total was 1251. There was a decided decrease from 1913 when 5332 were constructed. The largest total was 7362 in 1907. Of the 1914 total 333 were of the Mikado type, 201 were switching engines, 166 consolidation, 174 Pacific and 69 electric.

Car production for 1914 amounted to 108,232 for the United States, Canada and Mexico, 104,541 being freight and 3691 passenger cars. This is the smallest total since 1911, when 76,407 cars were built. The totals for 1906 and following years were as follows, those up to 1911 including Canadian output, while those for 1912 and years following include Canadian output and equipment built in railroad shops:

1906.....	243,670	1911.....	76,407
1907.....	239,645	1912.....	155,489
1908.....	78,271	1913.....	210,195
1909.....	96,419	1914.....	108,232
1910.....	185,357		

According to information given out by the Baldwin Locomotive Works its output for 1914 was 800 locomotives, which is the smallest number since 1908 when it was only 617. Of those built last year 604 were steam, 190 electric and 6 gasoline. The average number of men employed for the year was 6759, against 15,813 in 1913. In 1912 19,300 men were working at one time. The company states that an order for 20 engines for France, placed November 3, was shipped November 21, while 30 for Russia were built in 35 days.

Coke Oven Accidents in 1913

The hazard of the coke industry compares favorably with the quarry industry and the surface workings of metal mines as shown by Bureau of Mines figures for 1913. The investigation conducted by the bureau includes the reports of 294 establishments, 67 of which were reported as idle, leaving 227 plants as operating. These plants employed 24,345 men and of this number 46 were killed, 342 seriously injured, and 2172 slightly injured. The fatality and injury ratios at coke ovens, quarries and surface metal mines compare as follows:

Number Killed and Injured per Thousand Employed at Coke Ovens, Quarries, and Metal Mines.

	Killed	Seriously Injured	Slightly Injured
Coke ovens, 1913.....	1.89	14.05	89.22
Quarries, 1913.....	1.72	10.28	62.55
Metal mines (surface only)....	2.06	21.75	92.13

The number of coke establishments is practically 575, with slightly over 100,000 ovens. The bureau's report embraces practically one-half of the operators and 80 per cent. of the ovens, the number reported to the bureau as active being 67,526, and in addition 12,450 ovens were reported idle. While the accident figures thus collected are not complete for the entire industry, they are representative. No distinction has been made concerning the type of ovens in use. Thirteen fatalities were caused by cars, carrier and motors and 7 by railroad cars and locomotives, these 20 being 43 per cent of the whole.

United Steel Company Extensions

The United Steel Company, Canton, Ohio, is planning a number of extensions to its plant. Two new mills will be installed, an 8½-in. and a 7½-in. bar mill. The building occupied by the heat treating and cold drawing department will be enlarged and new equipment will be added. Extensions will be made to the electric furnace department and it is possible that an additional electric furnace will be installed. The company's open-hearth furnace and plate departments were shut down January 1 in order to install its new universal plate mill which will have a capacity for rolling plates from 8 in. to 48 in. in width. This large mill will replace the company's present 40-in. universal mill which is being dismantled. It is expected that the installation will be completed so that the plant can resume operations in all departments about February 15.

The meeting of the Philadelphia Foundrymen's Association at the Manufacturers' Club, in that city, on Wednesday evening, January 6, at which officers were elected for the new year, was the most interesting that has been held in many months. The election resulted in the unanimous choice of the following to serve during 1915:

President, Thomas Devlin, Thomas Devlin Mfg. Company.

Vice-president, August A. Miller.

Treasurer, Josiah Thompson, J. Thompson & Co.

Secretary, Howard Evans, J. W. Paxson Company.

Executive Committee—Walter Wood, R. D. Wood & Co.; Thomas M. Eynon, Eynon-Evans Mfg. Company; H. L. Haldeman, Pulaski Iron Company; Walter T. MacDonald, Schaum & Uhlinger Company; Walter S. Bickley, Penn Steel Casting & Machine Company, Chester, Pa.

Trustees—Thomas Devlin, president; Josiah Thompson, treasurer, and Howard Evans, secretary.

Official chemist, George C. Davis.

The Whiting Foundry Equipment Company, Harvey, Ill., represented by S. R. Vanderbeck, Philadelphia, was elected to membership.

Secretary Evans presented a communication from Frederick D. Dimmick, referring to the lack of action by the railroads, on the order of the Interstate Commerce Commission, reducing the all-rail freight rate on pig iron from the South to points in the Philadelphia district. A reduction of 35 cents a ton had been made by direction of the Interstate Commerce Commission on rail and water rates of certain lines and co-operation was asked in the effort to have the commission reopen the matter and direct all Northern railroads to make the reduction applicable to all pig-iron receiving points. The members of the association were asked to lend their aid in this direction. Discussion ensued on the recent 5 per cent. advance in freight rates granted the Eastern railroads, and it was the consensus of opinion that the consumer would have to pay it.

Business conditions were briefly reviewed and while few of the foundrymen could report any material gain at this time, there was a general feeling that betterment is at hand, although the forward movement will probably be slow.

The paper of the evening was on "The Necessity of a Foundry Engineer," by Walter F. Prince, foundry mechanical engineer, New York. In the writer's absence the paper was read by August A. Miller. It is given in large part on other pages.

In the discussion of the paper various members upheld the view of Mr. Prince in connection with foundry practice. Among them was W. J. Koch, of the Fort Pitt Steel Casting Company, McKeesport, Pa., president of the Pittsburgh Foundrymen's Association. He said that the present age is one of educational advance. Foundrymen are more inclined to give and take ideas, to co-operate along many lines, and in every case to their mutual gain. He confirmed Mr. Prince's views and said that he had experienced much difficulty in trying to have new methods adopted, but by perseverance much had been gained.

Following adjournment luncheon was served. Howard Evans acted as toastmaster.

Robinson & Co., manufacturers of agricultural implements, Richmond, Ind., announce that their name has been lengthened to Swayne, Robinson & Co. The president of the company, Samuel Edward Swayne, has been identified with it for a great many years and the new name is, therefore, more representative of the ownership, although no change has taken place in either ownership or management, these continuing exactly as heretofore.

The claim of purity of the oxygen and hydrogen made by the International Oxygen Company's apparatus was, through a typographical error, mentioned as 90 instead of 99 per cent, in an advertisement in *The Iron Age* of January 7.

Pittsburgh and Nearby Districts

The Western Conduit Company, an identified interest of the Youngstown Sheet & Tube Company, will make additions to its plant at Youngstown, Ohio. A new building will be erected to contain the pickling department, warehouse and assorting rooms. The company makes armored and other kinds of electrical conduit.

The 10-in. mill in the Brown-Bonnell works of the Republic Iron & Steel Company at Youngstown, Ohio, recently made 420 tons of skelp in 11½ hours. Its best previous record for one turn was 342 tons.

The Washington Tin Plate Company, Washington, Pa., has filed notice of an increase in its capital stock from \$350,000 to \$400,000.

The Youngstown Sheet & Tube Company, Youngstown, Ohio, is now caring for 35 or more indigent families that live in East Youngstown, where its works are located. The work is under the supervision of Dudley R. Kennedy, special agent of the company.

At the annual meeting of the structural section of the Engineers' Society of Western Pennsylvania, held in its rooms in the Oliver Building, Pittsburgh, last week, officers for 1915 were elected as follows: Paul Woefel, president; H. A. Thayer, vice-president; Herman Laub, W. A. Nichols and A. C. Donaldson, directors. O. E. Hovey, assistant chief engineer of the American Bridge Company, read a paper on "Emergency Dams of the Panama Canal."

The New Castle and Shenango works of the American Sheet & Tin Plate Company at New Castle, Pa., containing 50 hot tin mills, are in full operation this week for the first time in some months.

The metallurgical and mining section of the Engineers' Society of Western Pennsylvania met in its rooms in the Henry W. Oliver Building, Pittsburgh, on Monday evening, January 11. A. E. Maccoun, superintendent of the Edgar Thomson blast furnaces of the Carnegie Steel Company, read a paper on "The Trend of Modern Blast Furnace Construction."

At Youngstown, Ohio, the usual committee has ascertained that the average selling price of common iron bars in November and December was 1.037c. This means that wages of puddlers will be reduced to \$5.50 per ton for January and February. The rate paid in November and December was \$5.60.

The sheet bar mill in the Farrell plant of the Carnegie Steel Company, at Farrell, Pa., turned out in December 12,600 tons of tin bars. In 1914 this mill made a total of 113,200 tons of tin bars, being 16,000 tons more than in any year since the plant was built.

William H. Hepburn, receiver of the Leetonia Steel Company, Leetonia, Ohio, has filed his final report in the court, in which he states that he operated the blast furnace of the company from the time of his appointment, July 8, 1913, until all the iron ore pledged as security for advances to him or the company was manufactured into iron, and the indebtedness paid, and until \$90,000 of the first mortgage bonds of the company, which had been pledged for indebtedness, were surrendered to him for cancellation. He recently sold the plant at public sale to Ernest Vanfossan, of the firm of Billingsley, Moore & Vanfossan, of Lisbon, Ohio.

The Oil City Foundry Company, Oil City, Pa., which has leased the plant of the Riverside Engine Company, Oil City, will use it for machine finishing work and for assembling air compressor parts and air heads.

Hefner & Maysiles, Grafton, W. Va., have started the operation of their new foundry and machine shop. In addition to doing general jobbing work the firm expects to manufacture a number of machine specialties.

The Columbia Gas Stove Company, Huntington, W. Va., is moving into a new plant. Some extra equipment will be required, included in which are a number of electric motors.

The Mesta Machine Company, Pittsburgh, has secured the contract for the new mills of the Empire Rolling Mill Company, Cleveland, Ohio. The contract in-

cludes one 28 x 44-in. finishing stand, one 28 x 44-in. roughing stand, one 30-in. pinion stand, five 28 x 38-in. finishing stands, two 28 x 38-in. jump roughing stands and two 24 x 48-in. cold mills, together with the drives. Contracts for a 156 x ¼-in. squaring shear, 226 x ¼-in. squaring shear, 42-in. x 20-ft. roll lathe or bar shear or doubling shears have not been closed.

Newark Foundrymen's Association

At its monthly meeting, January 7, the Newark Foundrymen's Association, Newark, N. J., was addressed by J. E. Johnson, Jr., consulting engineer and metallurgist, New York, on the topic, "Notes on Metallurgy of Cast Iron in the Light of Recent Developments." With the aid of lantern slides, Mr. Johnson made clear the process which he has developed for breaking up the graphite in cast iron and causing it to form in small balls or patches rather than in streaks, stars or cleavage planes. By the introduction of oxygen into iron he has achieved an approximation of charcoal pig iron, an iron which is strong and tough and of high chilling qualities. His experiments were described at length, with illustrations, in *The Iron Age* of February 19, 1914. Mr. Johnson laid stress on the possibility of improving poor and normal irons with an admixture of oxygen-bearing iron, though he told his hearers that he did not claim to have found a panacea for all of the ills of the foundry, and that he doubted whether anything of this kind existed. The foundrymen were intensely interested in the subject, which was new to most of them and its theory was pronounced revolutionary from their point of view. Mr. Johnson made his presentation more convincing by answering a number of questions which were propounded and was heartily thanked by the members.

Republic Iron & Steel Company Changes

Changes in the sales forces of the Republic Iron & Steel Company have been made as follows: D. S. Guthrie has been transferred to the Chicago office, to take the place of R. P. Zint, resigned; W. B. Topping is sent to Cleveland from the Philadelphia office; W. H. Oliver is made general manager of sales of the Philadelphia district to succeed W. B. Topping, to whom he has been assistant. Mr. Oliver has been with the company 15 years and formerly was a salesman attached to the New York office. He covered the Philadelphia territory prior to the opening of an office in that city in 1912. Since then he has been connected with that office.

The mechanical problems in the matter of tall building foundations are to be discussed by Dr. T. Kennard Thomson, consulting engineer, New York City, at a meeting of the American Society of Mechanical Engineers, Friday evening, January 15, at the Engineering Societies Building, 29 West Thirty-ninth street, New York. The lecture will cover the removal of a 17-story office building and the effect of rust on the steel structure, and also Dr. Thomson's plans for the development of a greater New York.

Arrangements have been made by Joseph T. Ryerson & Son, Chicago, for the manufacture under their supervision of the bar iron and sheet products formerly marketed by the Zug Iron & Steel Company, Pittsburgh. These products will continue to be manufactured under the Zug specifications, retaining the same qualities that enabled the company to achieve its high reputation.

The Chippewa Foundry & Machine Company, Chippewa Falls, Wis., has bought the patents for the Hannegan steady stream pump from Thomas P. Hannegan and Ernest Scheel of Turtle Lake, who have been manufacturing the pumps in a small way and have found them giving general satisfaction. Mr. Hannegan will be the traveling representative for the company.

The Wright Wrench Company, Canton, Ohio, has received a large export order for forgings, which, it is stated, will be used in the building of submarines.

Youngstown Sheet & Tube to Readjust Wages

The Youngstown Sheet & Tube Company has posted notices at its works at East Youngstown, Ohio, as follows: "Effective January 1, some readjustment of wage rates will be made in the different departments. Employees affected will be advised as promptly as possible."

James A. Campbell, president of the company, has made a statement as follows: "The notice means no general reduction in wages. It forecasts a readjustment of the wages of certain men on certain finishing mills and perhaps other work where improvements have been made at considerable expense which have considerably increased the output. The proposed readjustment means nothing to the community nor to our employees in general. We cannot tell just when the readjustments will be announced as it will take some time to make them, and we want to see what our competitors are going to do. It is probable that other large concerns will take similar action."

Large Increase in Steel Corporation Orders

The statement of the United States Steel Corporation of unfilled orders on its books December 31, 1914, shows a total of 3,836,643 tons, as compared with 3,324,592 tons on November 30. This represents a gain of 512,051 tons and is the first increase since August, 1914. On December 31, 1913, unfilled orders were 4,282,108 tons. Large contracts for tin plate for 1915 account in part for the size of the increase in December. The following is a statement of unfilled tonnage for each month beginning with the high point of December 31, 1912:

December 31, 1914..3,836,643	November 30, 1913..4,396,347
November 30, 1914..3,324,592	October 31, 1913..4,513,767
October 31, 1914..3,461,097	September 30, 1913..5,003,785
September 30, 1914..3,787,667	August 31, 1913..5,223,468
August 31, 1914..4,213,331	July 31, 1913..5,399,356
July 31, 1914..4,158,589	June 30, 1913..5,807,317
June 30, 1914..4,032,857	May 31, 1913..6,324,322
May 31, 1914..3,998,160	April 30, 1913..6,978,762
April 30, 1914..4,277,068	March 31, 1913..7,468,956
March 31, 1914..4,653,825	February 28, 1913..7,656,714
February 28, 1914..5,026,440	January 31, 1913..7,827,368
January 31, 1914..4,613,680	December 31, 1912..7,932,164
December 31, 1913..4,282,108	

The International High Speed Steel Company, 478 Pearl street, New York City, has acquired a tract of nine acres at Franklin, near Rockaway, N. J., on which it will erect a large plant for the manufacture of its Bulldog brand of hollow and solid mining drill steel in all sections, shapes and sizes; and also of high speed tool and automobile steels of every description. It is expected that the plant will be in operation by April. When completed it will give employment to several hundred men.

The Kerr Turbine Company, Wellsville, N. Y., announces that its New York office is now in charge of Benjamin G. Fernald as district manager. The office will remain in the Singer Building but is being removed to room No. 801 in the annex—95 Liberty street. Lawrence G. Hanmer will continue to be associated with the New York office.

The Union Rolling Mill Company, Cleveland, Ohio, is having plans prepared for the addition of a structural bar mill. This mill will be housed in a building 50 x 400 ft., to be erected adjoining the company's present rolling mill plant.

A new composition valve disk for steam service has been placed on the market by Jenkins Brothers, 80 White street, New York City. Steam pressures up to 150 lb., it is stated, can be used with the new disk.

The Patterson Tool & Supply Company, Dayton, Ohio, announces that on or about January 15 it will occupy its new quarters, 123 and 125 East Third street, in the Huffman-Harries Block.

H. H. Hossman, Portsmouth, Ohio, has secured contract for installing two Amsler stoves for the Sarafi furnace of the Kelley Nail & Iron Company at Ironton,

FOREIGN TRADE CONVENTION

Programme of Meeting to be Held in St. Louis, January 21 and 22

The second national foreign trade convention will be held at St. Louis Thursday and Friday, January 21 and 22, at the Planters Hotel. It is called by the National Foreign Trade Council, created at the foreign trade convention held at Washington in May, 1914.

The first session is called for 10 a. m. Thursday. E. A. S. Clarke, president Lackawanna Steel Company, will be temporary chairman. William C. Redfield, Secretary of Commerce, and James A. Farrell, president United States Steel Corporation and chairman of the Council, are among those who will make addresses at the opening session. The formal papers of the morning are: "Problems Arising in War and Commerce," by John Bassett Moore, formerly counselor of the State Department, and "Foreign Banking, Loans and Credits," by Benjamin Joy, Shawmut National Bank, Boston, and others.

The remainder of the programme is briefly as follows:

Thursday, 2:30 p.m.

"Government Regulation of Commerce as Affecting Foreign Trade," by W. L. Saunders, chairman of the board Ingersoll-Rand Company, New York. Discussion by John D. Ryan, president Amalgamated Copper Company and Carman F. Randolph, New York.

"Problems of the Smaller Manufacturer and Merchant in the Development of Foreign Trade," by William C. Downs, U. S. commercial attaché for Australasia. Discussion by C. D. Mitchell, president Chattanooga Plow Company, Chattanooga, and H. C. Lewis, National Paper & Type Company, New York.

Group session, 4:30 to 6:00 p.m.: "Problems Arising in Foreign Trade."

Group session, 4:30 to 6:00 p.m.: "Foreign Banking, Loans and Credits."

Group session, 4:30 to 6:00 p.m.: "Government Regulation of Commerce as Affecting Foreign Trade."

Group session, 4:30 to 6:00 p.m.: "Problems of the Smaller Manufacturer and Merchant in Developing Foreign Trade."

Thursday, 8:00 p.m., banquet.

Toastmaster, Alba B. Johnson, president Baldwin Locomotive Works, Philadelphia.

Friday, January 22, 10:00 a.m.

"Commercial Education for Foreign Trade," by Prof. Edwin F. Gay, dean of Graduate School of Business Administration, Harvard University. Discussion by Prof. J. W. Jenks, School of Commerce, Accounts and Finance, New York University. Prof. G. L. Swiggett, University of Tennessee Knoxville, and W. D. Simmons, president Simmons Hardware Company, St. Louis.

"Merchant Marine," by Welding Ring, of Mailer & Quer-eau, New York.

Group session, 12:00 to 1:30 p.m.: "Commercial Education for Foreign Trade."

Group session, "Merchant Marine."

Friday, 4:00 p.m., final session.

Delegates, it is expected, will have an exceptional opportunity to avail themselves of advice and information from Government sources. In connection with the work of the Bureau of Foreign and Domestic Commerce of the Department of Commerce, recently opened at St. Louis, Dr. E. E. Pratt, chief of the bureau; Charles S. Donaldson, chief of the consular division; Louis Dornetzsky, chief of the tariff division, and others, will be in St. Louis during the convention.

The secretary of the National Foreign Trade Council, Robert H. Patchin, may be reached, until January 20, at 64 Stone street, New York City.

"Commerce Reports" is the title of the new daily which took the place of the "Daily Consular and Trade Reports" issued by the Bureau of Foreign and Domestic Commerce at Washington, beginning with the issue of January 2, 1915. Heretofore the older paper was four days in the making, whereas the new one is announced as being turned out in 10 hours. "Commerce Reports" will be a daily messenger from 300 American consuls, 10 commercial attachés, eight branch offices of the Bureau and numerous expert commercial agents in various parts of the world.

The Machinery Markets

Improvement is noted in almost every direction, but it is developing slowly as was to be expected. Less emphasis is placed on the amount of foreign business that is being booked, but the demand from domestic sources is stronger, a turn which is encouraging in view of its indicating a healthier condition of home industries. Though more numerous, orders continue small and the railroads have not yet come forward as buyers to any noticeable degree. In New England the makers of planers and shapers are busier, which is a good symptom. In New York some good prospects are near closing. The situation has improved in Cleveland which is feeling a demand from Canada based on the making of war materials. The volume of single-tool orders is satisfactory in Detroit and a betterment in the general industrial situation. In Milwaukee trade is quiet. The foreign trade continues to hold up in Cincinnati, with lathes still the main requirement, while domestic inquiries show more life. Business continues to improve in the central South, where woodworking factories are going on full time. In St. Louis the betterment is going on steadily, both in new and second-hand tools. Texas notes an increase in inquiries and better general conditions. Sales of miscellaneous machinery are increasing in the San Francisco territory. In the Pacific Northwest general trade is stimulated by large orders for timber and all along Puget Sound mills are resuming operations; inquiry for railroad material is more active and dealers hope to close some of the business which has been pending.

New York

NEW YORK, January 12, 1915.

The general opinion is that the export demand for machine tools is falling off, though some good inquiries which have been pending for some weeks are still considered to have some life. With the dwindling of foreign inquiry, however, there is coming to the surface some encouraging prospects from domestic sources, some of which seem to have taken tangible form since the opening of the New York Automobile Show. Reports are current of buying contemplated by manufacturers of both automobiles and parts. Other manufacturers whose plants have been made busy by war orders, such as the E. W. Bliss Company and the Bethlehem Steel Company, are showing renewed interest in tools such as they recently have purchased. Orders will soon be placed for the large quantity of equipment which the Remington Arms Company will require for its new plant at Bridgeport, Conn.

Interest in the making of shrapnel is not as keen as it was, this sort of activity having been transferred to Canada. It is understood that most of the shrapnel requirements of both England and Russia will be cared for by the former country and Canada. It is feared that the large Russian inquiry which has been before the trade for many weeks has gone to England, though this is not definitely known. From Birmingham, England, inquiries for a large number of machine tools have been received. In Canada a great many shops are busy on shrapnel. According to the information received here the Canadians are furnished with the blanks and paid \$5.50 for each shrapnel case, and commissions to do the work are obtained without much difficulty whether the shop can supply 10 or 100 or more per day.

The business, referred to a week ago, which the Westinghouse Electric & Mfg. Company was reported to have received from the Washington Steel & Ordnance Company was not for shrapnel, as stated, but for exploders used on high explosive projectiles. The Westinghouse company is re-equipping turret lathes, of which it had a large battery, for the work. The Washington Steel & Ordnance Company has booked some large orders.

Though the matter of deliveries was supposedly made clear to the agents of the French Government, some of them have been finding fault of late with the time required to fill the orders which were placed. It is reported that France is rushing to completion a vast ordnance works in which many American tools will be placed. The stock sheets of some tool makers indicate that they cannot make any deliveries on new orders for several weeks to come, despite the fact that in cases their shop forces have been almost doubled. Some machine tool salesmen are of the opinion that it is far healthier for the industry which they represent if large quantities of shrapnel and projectile-making machinery is sold abroad rather than in this country, pointing out that when the need for such machinery had passed here it probably would be thrown on the market and for a considerable time would interfere with sales of new tools.

The Prudential Oil Corporation, 17 Battery place, New York, is to build an oil refinery in Baltimore. It has bought 68 steel tanks and is taking bids on 200 tank cars. Dr. Dudley, 54 Wall street, it is understood, is president, and the Estate of Anthony N. Brady is interested in the enterprise.

The Ballston Fibre Products Company, manufacturer of box boards, Ballston Spa, N. Y., has been incorporated by C. V. Barrett, Little Falls; R. Young and H. J. Meader, Utica, N. Y., with a capital stock of \$50,000, and will take over the property of the Union Bag & Paper Company, Ballston Spa. Plans include overhauling the plant, installing a new back drive, etc. Henry J. Meader is president.

The Smith's Sons Harness Company, Buffalo, has been incorporated with a capital stock of \$55,000. A factory has already been established at 57 The Terrace, for the manufacture of harness and saddlery. D. F. Smith, Attica, N. Y.; W. J. and E. A. Smith, Buffalo, are the directors.

The Pennsylvania Feldspar Company, Charlotte, N. Y., will rebuild its feldspar mill at Greece, N. Y., recently destroyed by fire. It will be of concrete, 60 x 106 ft. George E. North is superintendent.

The Barker Cold Storage Company, Barker, N. Y., recently incorporated with a capital stock of \$50,000, will build and equip a cold storage plant. The directors are A. J. Todkill, Barker, N. Y.; G. C. Lewis and D. Tice, Lockport, N. Y.

A bond issue of \$30,000 for the construction of a water-works system has been voted by the town of Barker, N. Y.

The Van Vechten Milling Company, Rochester, N. Y., has been incorporated with a capital stock of \$100,000 to operate a flour and feed mill. W. W. Van Vechten, 196 Smith street, Rochester; A. H. Case and W. C. Schmidt are the incorporators.

The Universal Steel Cabinet Company, 2026 Pacific street, Brooklyn, N. Y., has installed a factory at this address for the manufacture of single unit filing boxes, etc. It is installing machinery. Henry S. Naul is president, and W. J. Tinsley, secretary.

Philadelphia

PHILADELPHIA, Pa., January 11, 1915.

Bids will be asked in a few days for the erection of a one-story brick and concrete heating plant 40 x 60 ft., for the Pennsylvania Railroad at Paoli, Pa., at a cost of \$10,000. Plans include two locomotive type boilers. All equipment will be installed by the motive power department of the railroad. J. T. Wallis, Altoona, Pa., is general superintendent of motive power.

The Philadelphia Dye Works, Hancock street, below Berks, Philadelphia, is having plans drawn for a one-story brick power house, including boilers, generators and other equipment. W. E. S. Dyer, Land Title Building, is the engineer.

A Pennsylvania charter has been granted to the Metal Engineering Company, Danville, Pa., to construct metal culvert pipes and similar articles. It has a capital of \$10,000 and the incorporators are F. Q. Hartman, M. G. Youngman, Ralph Kisner, John R. Cornman and William G. Williams.

The recent fire in the hammer shop of the Richmond Forgings Corporation, Aca, Richmond, Va., which did about \$20,000 damage, did only slight harm to the machinery. It will be replaced by a steel building 70 x 200 ft., which will be completed within six weeks. Other parts of the shop are running as usual; and alteration is being made to the equipment which will facilitate future operations.

New England

BOSTON, MASS., January 12, 1915.

The machinery trade is encouraged. Almost everyone connected directly or indirectly with the machine tool and supply business is feeling much better. The belief is pretty general that the worst is over and that 1915 will end with a sizable total on the right side of the ledger. The "war business" is extending into unforeseen channels. For example, the British Government has placed orders for a vast number of patented pencils for its troops. Especially interesting is a great order for razors for the British soldiers. It will keep a New England factory busy for several months. The reason given is that the British war department has discovered that the razors used by its army are of German make and must be replaced, even though the American price is much higher than that which was formerly paid.

The machine tool situation generally is improving. Manufacturers of planing machines are busier than they have been for some months; but the demand is confined to the smaller sizes. Shapers are in a correspondingly greater demand. The tool steel people report a better condition of business, mostly for small lots; and their information is that manufacturers of supplies which go to railroads promise to be better customers. The feeling is that the railroads will respond gradually to the results of the freight rate increase.

New construction for industrial purposes goes along slowly; but it is known that various firms have plans for extensions which will be carried out as soon as the trend of business starts upward in a strongly definite manner, and many men in the trade believe that that time is not far distant.

The Whitin Machine Works, manufacturer of cotton machinery, Whitinsville, Mass., is proceeding with an addition, 50 x 200 ft., to its foundry which will add 50 per cent. to the capacity of the department. As soon as business revives the building will be completed and equipped.

The Standard Mfg. Company, Bridgeport, Conn., manufacturer of gear cutting machines and electrical specialties, has awarded the contract for the three-story addition to its works, mention of which has already been made.

Landers, Frary & Clark, New Britain, Conn., manufacturer of cutlery and hardware specialties, will erect a factory for the making and fashioning of celluloid.

The Newcastle Company, Anson, Maine, is erecting a box factory, 60 x 300 ft.

The Mills Woven Cartridge Belt Company, Worcester, Mass., will build an addition, 50 x 120 ft.

Catalogues Wanted

The Files Engineering Company, Providence, R. I., has established a branch office at 120 Kossuth street, Bridgeport, Conn., where it will contract for power, heating, drying, evaporating and steam specialty work. The company requests that catalogues and other literature descriptive of apparatus and appliances relating to these lines be sent to the Bridgeport office.

Chicago

CHICAGO, ILL., January 11, 1915.

The year opens up with some little improvement in the aggregate of demand for machine tools; but the general character of inquiry is still confined to the one and two tool variety. Outside of the particular field of strictly machine tools there has also been a marked improvement in the buying of mechanical equipment for the plant department. Foundry equipment has been moving at a much better rate. The Vulcan Engineering Sales Company, Chicago, reports sales the past week of a 6-in. jolting machine to the Hooker Electro-Chemical Company, Niagara Falls, two 6-in. jolting machines to the King Sewing Machine Company, and two combination riveting and punching machines to the Fore River Ship Building Corporation.

The Reynolds Bleacher Company, Chicago, has been incorporated with a capital stock of \$10,000, to manufacture and deal in grain bleaching machinery, etc. Francis J. Callahan, James E. Callahan, 139 North Clark street, and John M. Sweeney are the incorporators.

R. J. Walls & Co., Inc., Chicago, has been incorporated by Ralph W. Woodbury, Homer W. Woodbury and Rose Harris, with a capital stock of \$10,000, to manufacture and deal in creamery and dairy machines.

The Arrow Forging & Tool Works, Chicago, has been incorporated by J. M. Deutch, J. S. Brown and J. M. Dresser, 208 South LaSalle street, with a capital stock of \$10,000 to do a forging and tool business.

The Davis Electrical Equipment Company, Chicago, has been incorporated with a capital stock of \$2500, to do a

general electric contracting and engineering business. The incorporators are E. S. Davis, J. E. Waters and I. G. Woodson.

The De King Mfg. Company, Chicago, has been incorporated by E. B. Martineau, G. E. Kerr and P. M. Merrick, with a capital stock of \$2500, to manufacture, construct and deal in machinery.

The Optigraph Company, Chicago, has been incorporated by Joseph A. White, Rossiter L. White and Payton J. Tuohy, 38 South Dearborn street, with a capital stock of \$5000, to manufacture and deal in moving picture machines, stereopticons, photographic apparatus.

The Electric Ricket Machine Company, Chicago, has been incorporated with a capital stock of \$100,000, to manufacture machinery and appliances. The incorporators are E. W. Mosher, 313 South Clinton street; E. H. Tillson and F. R. Westcott.

The Korff Mfg. Company, Chicago, has been incorporated with a capital stock of \$50,000 by T. F. Hyland, F. H. Korff and J. Muhle, 35 North Dearborn street. It will manufacture machinery.

The Shippers Refrigerating Car Company, Chicago, has been incorporated by Harry H. Phillips, Charles J. Horn and Oscar Anderson, with a capital stock of \$500,000, to manufacture, build or construct, maintain and repair, etc., railroad cars, locomotives and all railroad rolling stock. Pain & Hurd, Rookery Building, Chicago, are its representatives.

Woodward & Branson, Inc., Chicago, has been incorporated with a capital stock of \$10,000 to manufacture and deal in automatic sprinkler equipment. William G. Branson, Clarence C. Green and William H. Engelman are the incorporators.

The American Standard Tool Company is soon to be incorporated with a capital stock of \$300,000 and will locate in Bloomington, Ill. It will manufacture various kinds of tools.

James D. Dibelka, 29 South LaSalle street, Chicago, is taking bids until January 21 for a power house and power plant for the State normal university, Carbondale, Ill., to be one story, 38 x 51 ft., of brick and stone.

The U. S. Wheel & Tire Company, Rockton, Ill., will build a large and modern plant.

The Ft. Wayne Rolling Mill Corporation has been organized with a capital stock of \$100,000, to manufacture iron and steel products. The incorporators are E. F. Yarnelle, H. C. Rockhill, John P. Evans, and others, Ft. Wayne, Ind.

The George L. Lamp Novelty Works, Nappanee, Ind., was destroyed by fire.

The City Council, Winfield, Kan., has authorized the water and light commission to advertise for bids for a \$15,000 addition to the electric light plant.

The Mineral City, Iowa, plant of the United States Gypsum Company is reported to be planning extensive improvements. It is said that the crushed rock storage capacity will be doubled and a new engine will be installed.

The Bathrick & Palmer Machine Company, Elkhart, Ind., has been incorporated with a capital stock of \$20,000 by F. M. Bathrick, F. J. Palmer and others.

The machine shops at the Lake Erie & Western yards, Tipton, Ind., were destroyed by fire and much valuable machinery damaged.

The Standard Plating & Brass Foundry Company, Anderson, Ind., has been incorporated with a capital stock of \$5000 to do a general manufacturing business. G. A. Robinson, O. H. Furr and A. H. Gillespie are the incorporators.

The roundhouse of the Atchison, Topeka & Santa Fe Railroad at Moline, Kan., was destroyed by fire.

The Kansas Public Utilities Commission has issued an order authorizing the city of Mineral, Kan., to issue \$4350 in bonds for improvements and extensions to the city water works.

Western Light & Power Company, Boise, Idaho, has been incorporated with a capital stock of \$100,000 to manufacture, store, transmit and distribute electric current. The incorporators are Lyon Cobb, Willard W. Burns and C. A. Barton.

Milwaukee

MILWAUKEE, WIS., January 11, 1915.

The past week a few scattering sales of single tools have been made and on the whole this division of the metal trades is improving slowly. As yet there is no sign of a resumption of demand for power units, business in which division during the past year was confined almost exclusively to municipal buying. General business thus far has remained quiet.

The Bay Iron Works, Bayfield, Wis., will soon be in the market for a small list of metal-working machinery to accommodate the production of several new devices, including a

stump puller and hoisting machine and an electrically-operated air-purifying appliance. Frank Blackmar is chief engineer.

The Olsen Concrete Mixer Company, Elkhorn, Wis., has started manufacturing operations in its new plant. Contracts have been placed for all malleable castings and gray iron work.

Contracts for the erection of the factory and shop group of the Davis Mfg. Company, Milwaukee, manufacturer of gasoline engines and motors, in West Allis, have been awarded by Klug & Smith, engineers, Milwaukee.

The American Skein & Foundry Company, Racine, Wis., has amended its corporate articles to reduce the capital stock from \$500,000 to \$300,000. No significance is attached to the action. W. F. Walker is president.

Phillipson Brothers, Argyle, Wis., have engaged J. R. Law, architect, Madison, Wis., to make plans for a garage and machine shop of fireproof construction to cost \$17,500.

Cleveland

CLEVELAND, OHIO, January 11, 1915.

The machine-tool situation has improved. Dealers are getting a somewhat better volume of orders and an improved volume of inquiries has set in. It is also expected that some purchases, that have been held up for several months, will be made shortly. The foreign demand for screw machines and turret lathes continues active, although no round lots are being purchased. Considerable demand for these machines has developed in Canada. Some of this Canadian business is coming from railroad shops, but it is believed that the early uses that these machines will be put to will be for making war material. The domestic demand is also broadening. A local plant making turret lathes is being operated with a night force and is about filled up with orders until April. On some machines it is not promising delivery until June. Business has improved with makers of plumbers' brass goods. The demand for wood-working machinery is very dull.

The inquiry of the Cleveland Railway Company, for machine tool equipment for its Harvard avenue shops, mention of which was made last week, includes the following list:

- Two 20 in. x 6 ft. engine lathes
- One 18 in. x 5 ft. engine lathe
- One 28 in. x 4 ft. engine lathe
- One 18 in. x 6 ft. engine lathe
- One 16 in. x 3 ft. 6 in. engine lathe
- One 30 in. x 8 ft. engine lathe.
- All the above machines to be motor driven.
- One 14-in. x 5-ft. tool room lathe
- One universal grinding machine
- One 13-in. sensitive drill
- One universal milling machine.

The Gutman Tractor Company, Cleveland, has been incorporated with a capital stock of \$10,000 by E. K. Hoy, L. M. Monges, B. A. Shatto, and others.

The plant of the Willard Storage Battery Company, Cleveland, was badly damaged by fire January 7, the loss being estimated at \$75,000.

The Tiffin Art Metal Company, Tiffin, Ohio, will enlarge its plant by the erection of an addition 40 x 80 ft. Another addition is also contemplated.

The Turnbull Wagon Company, Defiance, Ohio, will add \$100,000 to its capital stock which will be used in erecting additional buildings, purchasing new machinery and extending its business.

It is announced that a new plant will be established in Warren, Ohio, by the Ohio Corrugating Company, which has been incorporated with a capital stock of \$50,000 by W. M. Kerr, C. H. Riegel, H. A. Foltz, R. A. Cobb, and F. W. Stillwagon.

Detroit

DETROIT, MICH., January 11, 1915.

The new year has opened fairly well for local machinery merchants. There has been a satisfactory volume of single tool sales, and this, together with a decided increase in the number of inquiries, is quite encouraging. The general industrial situation is also somewhat better, the large stove manufacturing plants are adding to their payrolls and other industries are becoming more active. A great many annual meetings of corporations will be held this month and a number of plans for extensions and improvements to plants are sure to develop. The foundry trade shows a little improvement. Building circles are quiet at present, but architects report that they are fairly busy with plans on which bids will be asked a little later; and with easier money in sight, builders are inclined to be optimistic.

The Remy Electric Company, a \$1,500,000 corporation now operating a plant at Anderson, Ind., has acquired a tract at Mt. Elliott avenue and Grand boulevard, Detroit, and will at once commence the erection of buildings to house certain of its departments. It is reported that the company contemplates moving its entire plant to this city. The company manufactures motors and electrical equipment for automobiles and railroad purposes.

The Krit Motor Car Company, Detroit, automobile manufacturer, has filed a voluntary petition in bankruptcy. No receiver has yet been appointed. According to officials of the company an effort will be made to effect a reorganization.

The Barnes Wire Fence Company, Detroit, has taken out a building permit covering the erection of a two-story factory 50 x 58 ft., to cost \$6000.

The R. B. Ridgley Company, Detroit, has been incorporated with a capital stock of \$50,000 to manufacture steel, mill supplies and machinery. It will take over the business of Richard B. Ridgley.

The Consolidated Car Company, Detroit, has been incorporated with a capital stock of \$100,000 by Randall A. Palmer, A. C. Knapp and M. J. Hammers, all prominently identified with the automobile industry. It has taken over the assets of the Abbott Motor Car Company and will manufacture automobiles. It will occupy the former plant of the A. C. Knapp Company, now being refitted to meet its requirement.

The Beck Cereal Company, Detroit, has awarded the contract for the erection of an addition to its plant.

The Mutual Motor Company, a \$1,000,000 corporation incorporated under Indiana laws, will shortly begin the manufacture of automobiles at Jackson, Mich. It will occupy the plant of the Imperial Automobile Company and an annual output of 5000 cars is planned. The directors are W. S. Kessler, A. Campbell, and others, of Jackson, and J. I. Handley, Indianapolis.

The public lighting commission, Detroit, is taking figures on additions to three electric substations.

Cincinnati

CINCINNATI, OHIO, January 11, 1915.

Optimistic reports are made as to prospects for domestic business in machine tools. While the number of actual orders reported is limited, some improvement has been noted in the volume of inquiry. The railroads in this vicinity are not buying machinery of any kind, except for urgent replacement purposes. The foreign trade continues to hold up remarkably well, with lathes still leading in the demand. The question of making deliveries on time has caused the refusal of considerable business; but in many cases lately, purchasers have granted extensions that facilitated the acceptance of a number of orders from abroad.

Reports that have lately circulated as to the receipt of a large foreign order for projectiles, appear to be without foundation, but it is known that there is a large lot of this business in sight for firms who are able to handle it.

Wood-working equipment, of all kinds, is in fairly good demand; but the sawmill business in the South is slow in recuperating. Few orders are reported from the Pacific coast.

Newport, Ky., is considering the installation of motor-driven pumps for its waterworks system. No bids will be asked for the necessary equipment until estimates have been completed that will require at least six weeks' time for preparation.

The J. M. Stockham Company, Portsmouth, Ohio, has had plans prepared for an addition to its ice plant that will be 54 x 108 ft., two stories, of brick construction. Ice-making equipment will be required.

The Dayton Pump & Mfg. Company, Dayton, Ohio, has increased its capital stock from \$100,000 to \$375,000. A number of changes and plant enlargements are planned; but details are not now available.

Press reports state that the Speedwell Motor Car Company, Dayton, Ohio, is working on plans for increasing its capital stock for enlarging its plant. No definite information as to additions contemplated has yet been given out.

The Hydraulic Press Brick Company, Ironspot, Ohio, will soon make additions to its plant that will increase its capacity over 50 per cent. New kilns will be built; and the changes contemplated are estimated to cost \$50,000.

The Bowling Green Motor Car Company, Bowling Green, Ohio, has changed its name to the Bowling Green Motor Truck Company, and will devote its energies to the motor truck business.

The Val Decker Packing Company, Piqua, Ohio, has

awarded contract to J. F. Geiger, Piqua, for an addition to its plant. Some refrigerating equipment will be required.

The Kyle Mfg. Company, Lancaster, Ohio, has completed moving its foundry and shop equipment from its former site in Washington Courthouse, Ohio, and expects to have its stove plant in operation within the next 30 days. Practically all needed equipment has been bought.

The Bathrick & Palmer Company, 1317 Princeton street, Elkhart, Ind., whose incorporation was recently noted, is fitting up a plant for the manufacture of a hardware specialty. It also intends to handle a general line of tool and die work.

St. Louis

St. Louis, Mo., January 11, 1915.

The machine-tool market continues to improve steadily, though slowly. Inquiry is for rather small business in the aggregate, but at that it is better in the total than has been the case for a long time. Slightly better inquiry has appeared for second-hand tools. Machinery demand for replacement and extension is improving. Requirements for new enterprises are also growing more encouraging both in tenor and quantity. The financial situation is improved by the lowering of discount rates by the Reserve Bank here and reports of the movement of cotton are helping to better matters, as money is flowing more freely.

The Yost & Chapman Mfg. Company, St. Louis, has been incorporated with a capital stock of \$25,000 by A. F. Yost, A. F. Chapman and C. S. Wesley Emig to engage in the general machinery business.

The Woodal Lumber Company, Campbell, Mo., has been incorporated with a capital stock of \$15,000 by O. A. McFarland, J. S. Woodall and Othar McFarland, and will equip a saw and planing mill.

Slater, Mo., will install a generating unit in its electric light plant, including one 275-kw generator and engine. L. E. Shepard is superintendent.

The Campbell Lumber & Supply Company, Kennett, Mo., has been incorporated with a capital stock of \$35,000 by O. A. McFarland, S. E. Wright and Othar McFarland.

The Laswell Lumber Company, Kennett, Mo., has been incorporated with a capital stock of \$180,000 by W. D. Laswell, W. A. Post and J. W. Grider, and will equip and operate mills.

The Butler Motor Company, Kansas City, Mo., has been incorporated with a capital stock of \$20,000 by John A. Butler, Frank L. Weaver and Frank N. Thompson, and will equip a garage.

The Springfield Water Company, Springfield, Mo., has plans for the expenditure of about \$100,000 in the improvement of its pumping plant, etc.

The Glenwood Brick & Tile Works, Glenwood, Ark., will be incorporated by P. S. Edwards, O. E. Grimes, and others, and will equip a plant for both brick and art pottery manufacture.

The electric light and ice plants of the Hollipeter & Jontz Company, Blytheville, Ark., are to be remodeled and new equipment added. The machinery capacity will be doubled.

An electric light and power plant is to be installed at Ft. Smith by C. C. Jones, G. E. Berson, S. E. Donoghue, and others, representing a local syndicate, and bids are being received on equipment for the plants.

Charles McKee, B. M. Gist, and others, will establish a flour mill at Rondo, Ark., to have a daily capacity of about 25 bbl.

The Pulaski Stone Company, Little Rock, Ark., will rebuild the State rock crusher and will install equipment for about 500 tons daily capacity. Electric power will be used.

W. P. Rodecker, Little Rock, Ark., has plans for the equipment of a plant for the manufacture of patented grain loading devices.

Benton, Ark., is completing plans for the expenditure of about \$100,000 for a waterworks plant and sewage disposal system. J. B. McCrary Company, Atlanta, Ga., is the engineer.

The enlargement of the waterworks plant at Harrison, Ark., and the equipment of sewage disposal plant has been postponed until March. George C. Frew is mayor.

The Van Buren Water Company, Van Buren, Ark., will improve its water system and will install about \$7500 of new plant equipment.

The Bailor Cooperage Company, Earle, Ark., has been incorporated with a capital stock of \$23,000 by L. B. Bailor, E. A. Powell and H. L. LaNieve.

The handle factory of T. J. Turner, Marked Tree, Ark., recently burned, will be rebuilt and re-equipped with larger capacity than before.

The Diamond Hoop Company, Proctor, Ark., has been incorporated with a capital stock of \$10,000 by David L. Watson, E. Mussell and L. W. Watson, and will install machinery and electric power equipment.

The Arkansas Mining & Development Company, Calico Rock, Ark., will equip a power house, etc. J. W. Myers, Nashville, Ark., may be addressed.

The Oklahoma Refining Company, Oklahoma City, Okla., is in the market for one 125-hp. horizontal boiler, engine, etc.

The cotton compress, recently destroyed at Hugo, Okla., with a loss of \$125,000 will be re-equipped by the International Compress Company, Paris, Tex., which was the owner of the plant.

The Jackson Veneer & Box Factory, Jackson, Miss., has been incorporated with a capital stock of \$10,000 by J. A. Roell, A. A. Case and John L. Moore.

The W. B. Utley Company, New Orleans, La., will install apparatus for the manufacture of paint, to cost about \$25,000.

The Delta Land & Timber Company, Carson, La., of which Charles S. Keith, Kansas City, Mo., is president, will equip a mill, kiln, power plant, etc., for the manufacture of pine lumber with a capacity of 150,000 ft. daily.

The Cudahy Packing Company will equip a cold storage, refrigerating and packing plant at New Orleans. J. E. Otis and Walter C. Keenan, New Orleans, La., are in charge of the work.

The Central Light & Power Company, Amite, La., will install two oil-burning engines in its electric generating plant for arc light service.

The Central South

LOUISVILLE, Ky., January 11, 1915.

Business continues to improve, especially where affected by the demand for war munitions. Wood-working factories in this vicinity, which have been operating on short time, have received orders to enable them to operate full time. The same is true of leather-working plants and some textile mills.

The Falls City Box & Basket Company, Louisville, will build a factory at Twenty-first street and Magnolia avenue at a cost of \$15,000. Wood-working machinery will be needed.

The Henry Vogt Machine Company, Louisville, is repairing the damage to its buildings done by fire recently. It reports that the machinery was only slightly damaged and that no new equipment will be needed.

The pattern building of the J. J. Reilly Mfg. Company, manufacturer of steam pumps, Louisville, was burned January 7 with \$8000 loss. It states that its machine shop was not damaged.

The Louisville Water Company is considering the enlargement of its pumping station in connection with the laying of an additional 48-in. main at a cost of \$175,000 from the pumping station to the reservoir. James Wilson is chief engineer.

Crider & Woods, Marion, Ky., are in the market for rock-crushing equipment. George M. Crider is in charge.

The Rockport Coal Company, Rockport, Ky., has been awarded franchises for operating water and light plants. The company advises that the plants will be used for its own purposes.

The municipal acetylene gas lighting plant at Adairville, Ky., blew up recently, causing a loss of \$2000. It is reported that the town will put in an electric lighting system.

The Globe Iron Roofing & Corrugating Company, Newport, Ky., has been incorporated with \$20,000 capital stock by Albert L. Andrews, William H. Andrews and others.

The plant of the Crump Milling Company, near Bowling Green, Ky., which was burned January 4 with a loss of \$16,000, will be rebuilt.

The plant of the Watts Creek Coal Company at Wofford, Ky., was sold recently to W. L. Moore, Williamsburg, Ky., who will put the mine in operation again February 1. He will be in the market for power plant supplies.

The Jacobs Auto Company, Shelbyville, Tenn., will buy a generator set for recharging storage batteries, in addition to an air compressor.

John Milne, Cleveland, Tenn., and others, have purchased a site for a chair factory.

J. W. Manfield, Dunlap, Tenn., will build a flour mill with a capacity of 50 bbl. a day.

J. H. Perry, Springfield, Tenn., and Richard Hopper, Nashville, Tenn., are equipping an automobile repair shop at Springfield.

The Business Men's Association, Cumberland Gap, Tenn.,

can give information regarding the establishment of a brick plant and cement mill at a reported cost of \$1,500,000.

E. E. McGee, LaGrange, Ky., will establish a flour mill with a capacity of 50 bbl. a day.

The Henry Maley Lumber Company will build a saw-mill at Jackson, Miss. It has been located at Yazoo City, Miss. The plant will be twice the capacity of the Yazoo mill, and much new equipment will have to be purchased.

Texas

AUSTIN, TEXAS, January 9, 1915.

An increase in inquiries shows that an improvement in machinery and tool trade conditions may soon take place. Cotton is moving more freely than for several weeks and the money from this source is finding its way into business channels.

The Consumers' Ice Company, Laredo, will erect a cold storage plant.

Sames, Moore & Co., Laredo, announce that they will build a cold storage plant.

The Gilmer Crate Company, Gilmer, is adding to its machinery with the view of making a specialty of manufacturing bushel baskets.

The Toyah Valley Irrigation Company, of Balmorhea, plans to construct a pumping plant to water 13,800 acres of land. Solomon Mayer, St. Louis, Mo., is president, and Richard P. Head, Balmorhea, secretary.

James H. Fuertes, city engineer, New York, has finished specifications for the proposed municipal sewage disposal plant at Dallas and bids on two units will be called for by February 1. R. R. Nelms is city water and sewerage commissioner.

The Southern Pacific Company has awarded the contract for the erection of a grain elevator at Galveston to Jeames Stewart & Co., Houston. The structure will have a capacity of 1,000,000 bu. of wheat.

The Temple Planing Mill, Temple, owned by J. B. Conlisk, which was recently destroyed by fire, will be rebuilt.

The Wolf City Light Company, Wolf City, which has been organized with a capital stock of \$6000, will build an electric light and power plant. M. Tasker is one of the principals.

The Citizens' Water Company, Cooper, will construct a waterworks plant. It has awarded the contract for developing a water supply to A. A. Snell, Houston.

The Inspiration Consolidated Copper Company, Miami, Ariz., will build a pumping station for supplying water for its mill.

The Pacific Northwest

SEATTLE, WASH., January 5, 1915.

Further signs of material stimulation in the local market are noted. An order for 2,000,000 ft. of tie timbers and tenders calling for bids for 20,000,000 ft. of ties, all for England, have given business a far healthier tone than for some time past. All along Puget Sound mills are re-opening. This will do more to brighten the general situation than any other one thing.

A number of inquiries are out for new equipment and construction materials for the railroads. Machinery dealers are now looking for the consummation of much business which has been pending since fall.

Frank C. Teck, secretary of the Commercial Club, Port Angeles, Wash., states that the Goodyear Timber Company will erect a saw and shingle mill, to cost \$1,000,000. It will have a capacity of 500,000 shingles and 400,000 ft. of lumber per day.

Chester E. Roberts, president of the Imperial Candy Company, Seattle, recently announced that his company will build a \$300,000 factory for the manufacture of crackers and candy.

The City Council, Clarkston, Wash., has granted a street railway franchise to A. G. Nortz and associates, who will build a line from Lewiston, Idaho. The electrical equipment will cost \$20,000.

The Lovegren Lumber Company's plant at Cherry Grove, Ore., has been taken over by W. L. Haskell, Montreal, and John M. Carpenter, Los Angeles. The new owners will begin operations soon. The mill recently installed will be operated for the present; but the company plans to construct a much larger plant later on.

The Puget Sound, Traction, Light & Power Company, Seattle, has purchased 3000 acres of land near Concrete, Wash., where it will construct a power plant to provide energy for Seattle factories.

The Hillhurst Lumber Company, Hillhurst, Wash., announces that it will construct a mill to be ready for operation in two months.

San Francisco

SAN FRANCISCO, CAL., January 5, 1915.

The machine tool business, though far from active, shows some signs of life. This is due to some scattered purchases which have lately been made by implement manufacturers, and a fair number of inquiries have been received from others, who anticipate a great deal of irrigation work. The demand, however, is mainly for machinery designed to reduce the cost of manufacture, and is rather from going concerns than new enterprises. Little business is expected during January and the first half of February; but merchants are optimistic as to the spring.

While local shop and foundry trade is still quiet, a few manufacturers, especially of implements, traction engines and hydraulic machinery, are unusually busy. Some important business is appearing in contractors' and quarry equipment. Sales of miscellaneous small machinery are steadily increasing. Wood-working equipment remains very quiet.

The Hampton Electric & Machine Company, San Francisco, has been incorporated with a capital stock of \$25,000, by C. J. Thelen, N. M. Lundstrom, E. J. Hampton, M. Herrick and L. Weich.

The Safety Mfg. Company, 1007 Broadway, Oakland, announces the purchase of a factory site in Alameda, and intends to build a plant for the manufacture of glue, metal polish, etc.

The Pinney & Boyle Company, Los Angeles, is building a plant at Vernon, Cal., for the manufacture of tinware and sheet metal products.

E. M. Chalmers and J. W. Geoghegan have purchased the Percy Thelan machine shop at 710 East Fourth street, Santa Ana, Cal., and will operate it as the Mayo Machine Works.

The Empire Zinc Company, Silver City, N. M., is building a tram to connect with the Santa Fe railroad, and will erect an electric power plant.

The Zenith Gas Engine Company, Los Angeles, has been incorporated with a capital stock of \$60,000, by J. C. Morris, M. L. Yeary and R. J. McDonald.

It is reported that the Riverside Portland Cement Company, Riverside, Cal., is preparing to build a plant on the Tule River near Porterville, Cal.

Plans have been completed for a 4-story concrete building, the first unit of the new plant of the Shredded Wheat Biscuit Company, Oakland, Cal.

Eastern Canada

TORONTO, ONT., January 11, 1915.

The Nova Scotia Steel & Coal Company, Sydney, N. S., will spend \$65,000 for machinery which will enable it to turn out 20 shells per hour.

The Federal Steel & Foundry Company, Ltd., Toronto, has been incorporated with a capital stock of \$1,000,000 by Robert A. Stephen, John N. Parkin, William M. Smith, and others, to operate a rolling mill, foundry, machine shop, structural steel establishment, etc. The ratepayers of Cobourg, Ont., passed a by-law authorizing the issue of debentures for the raising of \$50,000 to aid the Federal Steel & Foundry Company, Ltd., which will erect a plant there. J. H. Cole is one of the principal stockholders.

Essex, Ont., is contemplating the installation of a new boiler and pump in its waterworks plant, to cost \$6500. W. D. Beaman is town clerk.

The new factory for the Sarnia Sheet Metal Products Company at Sarnia, Ont., has been completed at a cost of \$20,000. It is now ready for the installation of the machinery.

The grist, carding, lathing and saw mills owned by Bernolt & Fils, St. Bonaventure de Upton, Que., has been destroyed by fire with a loss of \$25,000. All the buildings will be rebuilt and machinery including gas and steam engines, steam heating plant, etc., will be required.

The Colonial Construction Company, Ltd., St. John, N. B., has been incorporated with a capital stock of \$24,000 by John M. Long, Lancaster, and others, of St. John, N. B., to manufacture lime brick, etc.

The La Briquerie Rimouski Limitee, Rimouski, Que., has been incorporated with a capital stock of \$49,000 by Fortunat Ringuet, J. A. Talbot, and others, to manufacture brick, lime, etc.

The Provincial Government of Ontario will construct an abattoir at Guelph, Ont. The building and refrigerating apparatus will cost \$40,000. The work will be under the super-

vision of S. A. Armstrong, assistant secretary, Parliament Buildings, Toronto.

Fire destroyed the round house of the Ontario division of the Canadian Pacific Railway, Trenton, Ont. Tools, a gas-electric car and engines were damaged. The loss will amount to \$50,000.

The ratepayers of Ottawa, Ont., voted \$420,000 for waterworks extensions, \$287,000 for sewage extensions, \$100,000 for a civic abattoir and \$50,000 for an incinerator plant.

The Fredericton Barrel & Box Milling Company, Ltd., Fredericton, N. B. has been incorporated with a capital stock of \$10,000 to manufacture barrels, boxes, lumber, etc.

The St. Roch L'Achigan Canning Company, care of the General Canning Company, 65 St. James street, Montreal, is receiving bids for furnishing a steam engine, boilers, etc.

Plans have been prepared by William Kennedy, Jr., for the installation of a steam plant at the pumping station of the Utilities Commission, Peterborough, Ont.

Brantford, Ont., has passed a by-law to grant \$100,000 to complete its waterworks plant. J. H. Spence is mayor.

Port Dalhousie, Ont., has passed a by-law to grant \$50,000 for a waterworks plant. T. O. Johnson is town reeve.

Aurora, Ont., has passed a by-law to grant \$8000 for a waterworks plant. W. J. Baldwin is mayor.

Smith & Rutledge, Newmarket, Ont., are in the market for one 25-hp. engine, one portable 20-hp. boiler, and one gas generator.

The Canadian Northern & Quebec Railway, St. James street, Montreal, will erect an engine house and machine shop at Longue Pointe, Que., to cost \$4500.

The Anglo-Franco Saddlery Company, Ltd., Montreal, has been incorporated with a capital stock of \$100,000 by Henri Gerin-Lajoie, Paul Lacoste, Thomas J. Shallow, and others, to manufacture saddles, harness, etc.

The Ball Furniture Company, Ltd., Hanover, Ont., has been incorporated with a capital stock of \$125,000 by R. J. John and A. E. Ball, and others, to manufacture woodenware, furniture, etc.

The Automatic Paper Box Company, Ltd., Toronto, has been incorporated with a capital stock of \$125,000 by W. P. King, 155 Springhurst avenue; H. H. Hawkins, and others, to manufacture paper, pulp, etc.

The Mfg. & Contracting Company of Canada, Ltd., Toronto, has been incorporated with a capital stock of \$150,000 by T. A. Rowan, J. E. Jones, Norman Sommerville, room 27-29, 59 Victoria street, Toronto, and others, to manufacture machinery and supplies.

The Globe Electric Machine Company, Ltd., Hamilton, Ont., has been incorporated with a capital stock of \$40,000 by Samuel G. Buskard, Ernest F. Lazier, Harold L. Lazier, and others, to manufacture machinery, including pressing machines, etc.

The Moyes Construction Company, Ltd., Toronto, has been incorporated with a capital stock of \$40,000 by Robert J. Moyes, 592 Gerrard street, East, and George Stagg, Frederick Reeve, and others, to manufacture brick, tile, etc.

The Alfred Tin & Roofing Company, Ltd., Alfred, Ont., has been incorporated with a capital stock of \$25,000. It will erect a factory for the manufacture of tin ware, roofing, etc., and has appointed Nestor Brisebois, Alfred, to be its attorney.

The Moncton Leather Mfg. Company, Moncton, N. B., is applying for incorporation with a capital stock of \$30,000 to manufacture harness and leather. Those interested in the company are Stephen O. Humphrey, J. J. W. Martin, M. H. Boudreau, and others.

The Electrical Truck Mfg. Company, Chatham, Ont., is completing plans for a factory.

A plant for the manufacture of cartridges is to be built by the Canadian Cartridge Company, Toronto, recently incorporated with a capital stock of \$100,000.

Western Canada

WINNIPEG, MAN., January 6, 1915.

The Western Electrical Company, Ltd., Saskatoon, Sask., has been incorporated with a capital stock of \$20,000 to manufacture electrical goods, machinery, etc.

Damage to the extent of \$38,000 was done by fire at the plant of the McLeod Flour Mills, McLeod, Alberta.

A waterworks plant will be constructed at Empress, Alberta, next spring to cost \$65,000. The John Galt Engineering Company, Judge Travis Building, Calgary, Alberta, is the engineer.

Bids will be received by S. H. Reynolds, chairman of the greater Winnipeg water district, 901 Boyd Building, Winni-

peg, Man., for the following machinery: One crusher, one rotary screen, three belt elevators, three belt conveyors, one power boiler, stack, pump and engine, complete excavating machinery, four locomotives, 46 dump cars, 20 flat cars, 10 box cars, four cabooses, one deep well pump, etc.

The Diehl Motor Car Company, Medicine Hat, Alberta, is in the market for a 5-hp., three-phase, 220-volt electric motor for alternating current circuit.

It is announced that the Canadian Pacific Mills, Ltd., Ocean Falls, B. C., will erect a paper mill there.

Large extensions will be made to the plant of the British Columbia Sulphite Fibre Company, Mill Creek, Howe Island, B. C.

Saanich, B. C., will call for tenders for the installation of a waterworks plant and system to cost \$375,000. Hector S. Cooper is municipal clerk.

Government Purchases

WASHINGTON, D. C., January 11, 1915.

Bids will be received by the Bureau of Supplies and Accounts, Navy Department, Washington, January 19, schedule 7759, 36 trolley hoists for handling 14-in. shells for Brooklyn; schedule 7758, one 100-hp. induction motor for Washington; until February 2, schedule 7777, three radial drills for Puget Sound; schedule 7797, one 5-ton jib crane for Boston; schedule 7812, one steel derrick for Philadelphia, and schedule 7816, miscellaneous induction motors for Norfolk.

Bids were received at the Bureau of Supplies and Accounts, Navy Department, Washington, December 29, for supplies for the navy yards, as follows:

Schedule 7636, Steam Engineering.

Class 1, Mare Island—One forging press. Bid 211, \$5750. Alternate—Same, f.o.b. works—Bid 34, \$3535; 211, \$5645 and \$4200.

Schedule 7647, Ordnance.

Class 21, Newport—One automatic motor-driven machine—Bid 144, \$2000, informal.

Similar bids were received January 5, as follows:

Schedule 7696, Ordnance.

Class 71, Washington—Three 16-in. geared-head lathes—Bid 1, \$3319.55; 83, \$3160; 90, \$3160; 112, \$3298; 126, \$3430.70, \$3314 and \$2457; 145, \$3129 and \$2700; 170, \$3010; 210, \$1932.

Class 72, Washington—Three selected geared-head lathes—Bid 1, \$2845.60; 83, \$2628; 90, \$2628; 112, \$2563; 126, \$2708, \$2610.50 and \$1878; 145, \$2700 and \$2250; 170, \$2244; 210, \$1938.

Class 73, Washington—One geared-head lathe—Bid 1, \$1927.25; 83, \$1784; 90, \$1784; 112, \$1926; 126, \$1980.25 and \$1930.25; 145, \$1850; 170, \$1807 and \$1795; 210, \$1325.

Class 74, Washington—One universal milling machine—Bid 1, \$1823; 34, \$1899.50; 79, \$2048; 112, \$1658; 145, \$1658; 169, \$2076; 170, \$1930; 175, \$1700.

Class 75, Washington—One wire feed screw machine—Bid 34, \$1125; 126, \$672; 169, \$960; 238, \$1386.

The names of the bidders and the numbers under which they are designated in the above lists are as follows:

Bid 1, Aumen Machinery Company; 33, Bethlehem Steel Company; 34, Brown & Sharpe Mfg. Company; 79, Frevert Machinery Company; 83, E. L. Fraser; 90, Garvin Machine Company; 112, Hendy Machine Company; 126, Kemp Machinery Company; 144, National-Acme Mfg. Company; 145, Manning, Maxwell & Moore; 169, D. Nast Machinery Company; 170, Niles-Bement-Pond Company; 210, Springfield Machine Tool Company; 211, United Engineering & Foundry Company; 238, The Warner & Swazey Company.

That an employer must take into consideration curiosity and impulsiveness of young employees is the decision of the Wisconsin Industrial Commission in the case of Morris Mathison vs. the Stoughton Wagon Company, Stoughton, Wis. Mathison, 14 years old, through curiosity placed his left hand under the suction pipe of an edger. His arm was drawn into the machine and mangled so that amputation at the elbow was necessary. Mathison is awarded \$1874 in weekly installments of \$9.37 from August 18, 1914.

Automobile manufacturers estimate that about 625,000 cars will be produced in the coming year, this number including gasoline and electric pleasure cars and commercial cars equipped with pneumatic tires.

Trade Publications

Steel and Specialties.—Ellsworth Haring, 114 Liberty street, New York City. Folder. Concerned with metals and specialties of various kinds for a number of different purposes. These include high-speed and tool steels, balls, magnets, sheet and strip steel, drill rods, wire, nickel, forgings, etc. All of these are listed with brief descriptions of the various lines handled. Mention is also made of the advice that can be furnished on the best grade of steel to be used for any purpose.

Hack Saws.—Diamond Saw & Stamping Works, Buffalo, N. Y. Wall hanger calendar. Size, 14 x 22 in. Calls attention to the Sterling line of hack saws and power hack saw machines. Illustrations of one of the blades and two of the machines using them are presented.

Graphite Paint.—United States Graphite Company, Saginaw, Mich. Booklet. Offers a number of facts pertaining to graphite paint which are based upon data collected by the company. The information is presented without many technicalities. A brief discussion of the various forms of graphite is presented, and particular emphasis is laid upon the fact that with this paint the use of dryers is minimized. There are numerous illustrations of the various classes of structures upon which this company's paint has been used, and a number of testimonial letters are included.

Calendar.—J. T. Knight & Son, Columbus, Ga. Wall hanger, measuring 15 x 26 in. Mention is made of the scrap iron and metal business conducted by this firm, and the pad, while only 6 1/4 in. high, has the dates printed in easily read figures. Calendars for the preceding and the following month are given on each leaf.

Phosphor Bronze and Alloys.—Phosphor-Bronze Smelting Company, 2200 Washington avenue, Philadelphia, Pa. Price list No. 27. Devoted to phosphor bronze and its use in castings and ingots. Tables giving the various sizes in which seamless drawn tubing, bushings, rolled and drawn rods, wire, wire rope, sheets, plates, etc., can be furnished, together with prices. A number of tables with useful information are included.

Boiler Tube Cleaners.—Lagonda Mfg. Company, Springfield, Ohio. Catalogue L-8. Describes a line of water, air and steam driven boiler tube cleaners for water tube and return tubular boilers. A general description of the standard line of cleaners and the special ones that are also made is presented, together with an illustrated description of the various types of cutter heads that can be supplied. Other boiler room specialties, such as a tube reseating machine, multiple water strainer, automatic cut-off valve and hose for operating the cleaners, are illustrated and briefly described. Illustrated lists of repair parts of the different cleaners are included.

Cranes.—Maris Bros., Fifty-sixth street and Gray's avenue, Philadelphia, Pa. Collection of bulletins. Pertains to the various types of cranes that can be supplied. These include single and double beam hand cranes, I-beam trolleys and freight handling and transfer cranes. All of these are described at some length, and the text is supplemented by numerous illustrations and dimension tables.

Crucibles.—Joseph Dixon Crucible Company, Jersey City, N. J. Booklet. After a brief introduction and list of the sizes in which the crucibles are regularly furnished, information is given on various kinds, including steel melting, tilting furnace, bottom-pour and self-skimming crucibles; crucible covers, retorts, stirrers, skimmers and dippers. General instructions on the use of crucibles, as well as the way to get the maximum service from crucibles used with oil-fired furnaces, are given. Mention is also made of foundry facings and a cement for the repair of worn or cracked fire-brick.

Calendar.—Flat-Top Fuel Company, Bluefield, W. Va. Wall hanger calendar, measuring approximately 25 in. square. The pad is about 14 in. high and extends the full width of the hanger. The figures used to mark the dates are large and easily read, a contrasting background being used with each date blocked in by rules. Each leaf contains a calendar for the preceding and the succeeding month and the moon's phases. Each square contains a small numeral showing the number of days that have elapsed since the first of the year.

Diesel Engines.—Busch-Sulzer Bros.-Diesel Engine Company, St. Louis, Mo. Pamphlet. Refers to a series of efficiency tests that were made on a 225-hp. unit. The purpose of the tests was to show what the engine could do under regular running conditions without any special tuning up. A brief description of the apparatus used in connection with the tests and the fuel are included. The tests were divided into two series, one of steady loads from no load to a 13 per cent. over-

load, and another of fluctuating loads ranging from 0 to 105 per cent. The results of these tests are summarized, and a number of curves are employed to show the results obtained.

Cutting Compound.—E. F. Houghton & Co., Third, American and Somerset streets, Philadelphia, Pa. Folder. Calls attention to Fileline, which is an oil designed for all metal cutting operations that permit the use of a water mixture. This oil is designed to be mixed in the proportion of 1 part of oil to 20 parts of water for cold saw work. The features of this oil, such as the securing of clean cuts and the prevention of oxidation are briefly touched on. Mention is made of the output, 900 pieces of 1 1/2-in. round heat treated stock in 10 hr., that has been secured with the use of this mixture, and an illustration of the machine on which the work was done is presented.

Air Compressors.—Chicago Pneumatic Tool Company, Fisher Building, Chicago, Ill. Bulletin No. 34-K. Gives general description and specifications for a line of fuel oil and gas engine-driven air compressors. Their application to the unit system of air power plants is mentioned, and data on the savings effected by the use of these compressors as compared with the steam engine and motor driven compressors are presented. The description of the compressors is supplemented by numerous engravings of the various parts.

Portable Electric Tools.—Neil & Smith Electric Tool Company, Cincinnati, Ohio. Circular. Mentions a line of portable electric grinding machines for truing up the centers of a lathe. One of the special features of this device, which was illustrated in *The Iron Age*, September 3, 1914, is that it is placed in the tailstock and the wheel brought in contact with the rotating headstock center, and as the spindle of the driving wheel is set at an angle of 60 deg. with the shank that is inserted into the tailstock, accurate results are said to be secured. Illustrations of the grinding device itself and also placed in a lathe for use are employed to supplement the text description. Mention is made of other electric tools, such as a drilling machine, a screw driver and a ball bearing grinding machine.

Steam Heating.—B. F. Sturtevant Company, Hyde Park, Boston, Mass. Pamphlet. Contains a reprint from *Power* of an article descriptive of the heating of the largest pier in the world, which is a two-story steel and concrete structure, 1206 ft. long and 400 ft. wide, located at Boston.

Hydraulic Pump.—A. L. Henderer's Sons, Wilmington, Del. Folder. Gives a brief description with illustrations of a double-piston, high-pressure hydraulic pump, which was illustrated in *The Iron Age*, December 31, 1914. Illustrations of the pump alone and in combination with an independent hydraulic jack are presented, and tables of the various sizes of jacks and combinations of pistons for the pumps that can be furnished are included. Mention is also made of other lines manufactured by the company, such as hydraulic jacks and punches, tube expanders, rivet sets, steel clamps, boiler test pumps, etc.

Eyelet Machines.—Waterbury Farrel Foundry & Machine Company, Waterbury, Conn. Circular No. 414-E. Presents a description of the construction, equipment and operation of a line of eyelet machines which in addition to turning out the parts for which they were originally designed and which gave them their name, produce a number of parts involving the cutting of a blank from sheet metal and the subsequent operations of drawing, forming, piercing, clipping, light stamping, etc. An illustration of some of the parts that have been completely finished on these machines is presented, together with a diagram showing the working capacity of the machine. An illustrated description of one of these machines appeared in *The Iron Age*, September 3, 1914.

Castings and Shafting Hangers.—Poole Engineering & Machine Company, Baltimore, Md. Two circulars. One relates to a line of gray-iron, charcoal gun iron and semi-steel castings that can be supplied up to 100,000 lb. each. Illustrations of the castings, which include engine cylinders and liners, transmission machinery, machine molded gears, centrifugal pumps and dredge machinery are presented. Mention is also made of the work which the company is prepared to do as a builder of special machinery. The other circular lists the various sizes and styles of shafting hangers, pedestals and couplings that can be supplied.

Surface Grinding Machines.—Diamond Machine Company, Providence, R. I. Pamphlet. Covers a line of automatic and hand surface grinding machines, the former of which was illustrated in *The Iron Age*, September 3, 1914. This machine is equipped for either belt or motor drive and the text description of it is supplemented by a number of engravings of the various parts as well as a condensed table of specifications. The other machines listed include a small hand machine with either plain or adjustable table as well as a larger size. Illustrations, brief descriptions and condensed specification tables are presented of the various hand machines.



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